Vol. 9. No. 1.

- 6 JUL 1978

WEED ABSTRACTS

January 1960

NOTES FOR READERS OF WEED ABSTRACTS

Weed Abstracts endeavours to provide a comprehensive coverage of the world's literature on weeds, weed control and closely allied subjects. To this end over 370 journals and nearly 100 annual reports are regularly searched. Other journals, reports, bulletins, etc. are abstracted as they are seen. Additional coverage is obtained through agreements with other abstracting organisations.

Abstractors

L. Kasasian (Editor)
D.M.L. Sparrow
J.W. Banfield
M.E. Lewis

Correspondence about subscriptions to Weed Abstracts should be addressed to: The Treasurer, British Weed Control Council, c/o National Association of Corn and Agricultural Merchants, Cereal House, 58 Mark Lane, London, E.C.3. Other correspondence should be addressed to the: Information Section, A.R.C. Unit of Experimental Agronomy, Department of Agriculture, Parks Road, Oxford.

As far as possible journal abbreviations given in the World List of Scientific Periodicals are used. Holding libraries in Oxford and elsewhere are also taken from the World List, e.g. O.BO. = Botany Department, Oxford. Numbers at the end of abstracts, e.g. 75(492) are for internal use only.

When a paper is by more than one author, only the address of the first author is given.

Where an abstract is taken from an abstracting journal the acknowledgement follows the abstract, e.g. Herb.Abstr., 2,163. Where it is only quoted in part the acknowledgement is proceded by the word "from", e.g. From Biol.Abstr., 2,294.

The Information Section is always pleased to receive comments and suggestions for the improvement of Weed Abstracts.

* An asterisk before the author's name indicates that only the title of the paper has been seen.

Continued from the inside back cover.

ac	- acre(s)	in.	- inch(es)	p.s.i.	- pounds per square in.
a.e.	- acid equivalent	kg	- kilogram(s)	v/v	- volume/volume
a.i.	- active ingredient	l	- litre(s)	w/v	- weight/volume
cm	- centimetre(s)	lb	- pound(s)	w/w	- weight/weight
d.b.h.	- diameter at breast height	m	- metre(s)	>	- greater than
		ml	- millilitre(s)	<	- less than
ft	- foot (feet)	oz	- ounce(s)	#	- pounds per acre
g	- gram(s)	post-em.	- post-emergence	±	- with or without
gal	- gallon(s)	pre-em.	- pre-emergence		
ha	- hectare(s)	p.p.m.	- parts per million		

Language abbreviations: an initial capital denotes the language of the article, a small letter that of the summary: - Dan. - Danish, Du. - Dutch, E. - English, F. - French, G. - German, It. - Italian, Jap. - Japanese, Nor. - Norwegian, Russ. - Russian, Span. - Spanish, Sw. - Swedish.

See also 78,113,126,139,141,142,143,147,153,203.

1. DENMARK. Beretning an faelles forsøg. [Summary of co-operative experiments.] Komm.Andelsbogtrykkeriet i Odense, 1959, pp.199, (Dan.), figs.,tabs.
p.23-43. Experiments with herbicides. This section consists mainly of tables which give the results of numerous tests comparing various commercial formulations of herbicides which were carried out in various parts of Denmark. The trials included:- a comparison of DNOC, dinoseb and 2,4-DB on undersown lucerne; the effects of DNOC, dinoseb and MCPB on direct sown lucerne; the effects of MCPB and 2,4-D on undersown red and white clovers,the effects of DNOC, dinoseb and MCPB on peas; the effects of DNOC, mecoprop and MCPA + 2,3,6-TBA on knotgrass [Polygonum aviculare], cleavers [Galium aparine], hemp nettle [Galeopsis tetrahit] and corn marigold [Chrysanthemum segetum]. One table, summarising the results of 480 experiments in barley and 257 in oats carried out between 1947 and 1958,show that spraying where the original weed infestations averaged 8.5, 19.2, 29.4 and 44.9% and weed control was 82-84% resulted in yield increases of 3.6%, 8.9%, 15% and 20% for barley and of 6.4%, 8.9%, 12.8% and 18.1% for oats. Spraying barley and oats with a mixture of MCPA + ammonium phosphate 10 kg/ha gave a greater yield increase than spraying with either compound alone and very slightly better weed control. - L.K. [O.W.]

2. SANTELMANN, P. and MEAD, J. (Univ., Maryland,U.S.A.) Chemical weed control in field crops. Md Univ.Ext.Fact Sheet, 1959, 13,pp.4, figs.3.
A table is included which summarises weed control recommendations for 1959-60 for the crops maize, small grains, soybeans and lucerne; and for the weeds Johnson grass [Sorghum halepense], wild garlic [Allium canadense], quackgrass [Agropyron repens], Canada thistle [Cirsium arvense], poison ivy [Rhus radicans], Bermuda grass [Cynodon dactylon], and woody plants (brush). - J.W.B. [92(75.2)]

3. GRANCINI, P. Il diserbo chimico del mais. [Chemical weed control in maize.] Maydica, 1959, 4,(4),98-113, (It.), figs. 8,tabs.1,bibl.8.
Trials indicated that for north Italian conditions where drought periods are frequent atrazine is preferable to simazine owing to its greater solubility and quicker action. In 1 trial simazine 1.5 and 2 kg/ha gave excellent control of Echinochloa crus-galli and Setaria viridis but in another trial where soil was lumpy and conditions dry simazine 1 and 2 kg/ha gave poor weed control. Premerge (dinoseb [amine]) also gave variable results - excellent where soil was well prepared and rain followed treatment, and poor where soil was dry and lumpy. E. crus-galli plants at depths of 5-7 cm were unaffected. In a trial where Premerge 2-16 kg/ha was applied when most E. crus-galli plants had emerged and some of the maize, the weed was only partially controlled and the maize was badly scorched but recovered. - D.M.L.S.

4. HANOWER, P., JANICKA, I., BRZOZOWSKA, J. and HOFF, M. Działanie odchwaszczające 2,4-D i azotniaku oraz ich wpływ na plon i skład chemiczny kukurydzy w fazie dojrzałości mleczno-woskowej. [The herbicidal effect of 2,4-D and calcium cyanamide and their influence on yields and chemical composition of maize in the milk-wax stage of maturity.] Roczn.Nauk rol., 1959, 80,(A, 1),149-70, (Polish,russ.,e.), tabs.10,bibl.23.
Gives the results of experiments in which 2,4-D or calcium cyanamide were applied to maize pre-sowing or pre-em. and followed by 2,4-D post-em. - From Authors' Summary. - L.K. [O.W.]

5. LIFSHITZ, N. (Plant Prot.Dep.,Min.Agric., Jerusalem,Israel). Simazin for weed control in corn and its use in the summer of 1956. Hassedeh, 1959, 39,(6), tabs.1.
Simazine pre-em. 0.5-0.75 kg/ha in 400 l can economically replace cultivations and hand weeding in maize [var. Super Laguna]. The main weeds controlled were Portulaca oleracea Amaranthus sp., Digitaria sanguinalis and Echinochloa colonum; weeds not controlled included Ecbalium elaterium, Molucella sp. and Grozophora sp.
Residual effects of simazine applied pre-planting varied in different localities. - M.E.L. [27(569)]

6. de BRUIN, H.J. (Geertjesweg 15,Wageningen, Netherlands). Onkruidbestrijding in granen met chemische middelen. [Chemical control of weeds in grain.] Meded.Sticht.Ned.Graan-Cent., 1958, 4,15-26, (Du.).
The discussion includes the information that DNOC 6 kg + sodium arsenite [40-50%] 1.5 l has given good control of chickweed [Stellaria media] in winter cereals. - L.K. [185(492)]

7. LIFSHITZ, N. (Plant Prot.Dep.,Min.Agric.,

Jerusalem,Israel). Simazin for pre-emergence weed control in irrigated corn (maize). Hassedeh, 1958, 38,(6),523-4.
Simazine pre-em. 0.25 and 0.5 kg/ha in 800 l water gave good control of most annual weeds in irrigated maize (var. Super Laguna) up to 20-30 days after application without crop damage. At 0.75 kg/ha the effective period was 30-40 days and some residual activity was still observed after 152 days. - M.E.L. [25(569)]

8. SHEBESKI, L.H., FRIESEN, G. and NAKONESHNY, W. (Univ.Manitoba,Winnipeg, Canada). The effect of weed control and fertilizers on protein content of wheat. Proc.5th Meet.Canad.Soc.Agron., 1959,84-8, figs.2,tabs.5.
Data obtained from trials over 2 years in which weeds were removed by hand, showed a consistent trend towards higher yields and protein content from weed removal, and, where yearly and 2-yearly averages were considered, a highly significant increase both in yield and protein content. In another experiment, fertilising (with 11-48-0 at 40 #) but not removing weeds significantly increased yields but not the protein content whereas removing weeds but not fertilizing significantly increased both yields and protein content. The highest yields were obtained from both fertilizing and weed removal and here protein content was not adversely affected. - D.M.L.S. [O.W.]

9. CHATEAU, R. (Cent.Tech.d'Agric.Trop., 45 bis Ave de la Belle Gabrielle,Nogent sur Marne,France). Recherche sur l'influence de l'epoque d'application du 2,4-D sur differentes variotes de riz a Richard-Toll (Senegal). [Research on the effect of the time of application of 2,4-D on different varieties of rice at Richard-Toll (Senegal).] Riz et Riziculf. & Cult. Vivrieres Trop., 2nd/3rd Q., 1959, 5, 117-9, (F.f.e.g.), tabs.6.
In trials during 1957 and 1958, 2,4-D (cyclohexanolalkyl ester) was applied at 620 g/ha in 100 l water to 4 rice varieties requiring different periods for maturity (Makalioka 823, Bentonbala, Sossonka, and R.T. 2015), on 5 different dates between 29 and 136 days after sowing. The highest yields were obtained from plots treated from the 30th-50th days after sowing and no deformities were observed on these plots. Plots treated 135 days after sowing produced yields significantly lower than the unweeded control. Spectacular control of Sphenoclea zeylanica was obtained. - D.M.L.S. [114(44)]

10. GREAT BRITAIN. Herbicides for rice. Typescript, Commonw.Bur.Field Crops, (n.d.), pp.2.
A bibliography with 21 references. - D.M.L.S. [392(42)]

11. PETERS, E.J., KLINGMAN, D.L. and LARSON, R.E. (A.R.S.,U.S.Dep.Agric.) Rotary hoeing in combination with herbicides and other cultivations for weed control in soyabeans. Weeds, 1959, 7,(4), 449-58, tabs.8,bibl.4.
In 3 years' trials rotary hoeing under wet or dry conditions in soyabeans planted in solid stands or 40 in. rows gave good control of weeds $<$0.25 in. high, without injury to the crop. Four repeated hoeings until beans were 8 in. high reduced yields of crop without improving weed control. PCP pre-em. 20 # gave more efficient weed control than rotary hoeing and also increased crop yields (except where soyabeans were planted shallow with a grain drill). Use of rotary hoe + herbicide did not improve weed control. Chlorpropham 8 # and dinoseb 7.5 # pre-em. gave excellent weed control but severely injured the crop. CDAA had little effect on weeds. The principal weeds were Amaranthus spp. and Digitaria spp.
Rotary hoe equipment and its use are described. - M.E.L. [O.W.]

12. LIFSHITZ, N. (Plant Prot.Dep.,Min. Agric.,Jerusalem,Israel). New herbicides in peanuts. Hassedeh, 1959, 39,(6), tabs.2.
In an observation trial simazine 0.125 kg/ha and diuron 0.5-0.75 kg/ha gave good weed control and no crop injury when applied pre-em. in peanuts; higher rates of simazine were injurious. The main weeds were: Portulaca oleracea, Digitaria sanguinalis, Amaranthus retroflexus, Amaranthus sp. and Chenopodium sp. - L.K. [26(569)]

13. CAMPRAG, D. and MATIC, I. (Fac. Agric.,Novi Sad,Yugoslavia). [Observations on the occurrence of dodder and an examination of the damage it causes to sugar beet.] Sborn.Mat.Srpske, 1958, 15, pp.10, (f.), tabs.4,bibl.7.
Observations made from 1953-6 show that infestations of Cuscuta spp. on sugar beet do not usually cause severe losses. In 3 years observations at the Sugar Beet Selection Institute at Crvenka, severe damage was observed: seed yields were reduced 55% and germinability 12%, root yields 59% and sugar yields 68%. In

another case where the infestation was delayed losses were much less. - L.K. [58(497.1)]

14. DETROUX, L. and WAUTHY, R. (Sta.de Phytopharmacie,Gembloux,Belgium). Essais de desherbage selectif des champs de betteraves effectues en 1958. [Selective weed control trials in sugar beet in 1958.] Publ.Tec.I.B.A.B., 1959, 1,pp.23, (F.f.g.e.), figs.9,tabs.4,bibl.1.

(1) PCP, as a 5% solution at 100 l/ha, and as 10% emulsifiable solution at 40 l/200 l and 40 l/800 l water, (2) neburon (wettable powder) 0.555 kg/ha, (3) DCU 7.3 kg/ha, all 3 applied pre-em.,and (4) sodium nitrate (16% nitrogen) 250 and 320 kg/ha in 800 l water applied post-em. at the 2 true leaf stage all gave satisfactory weed control without depressing sugar yield and allowed of the use of monogerm seed, sowing at normal time, and a longer period for singling. Sodium nitrate gave poor control of grasses and perennial broad-leaf weeds and was less lasting in effect than PCP. A new product containing cyclo-octyl-dimethyl-urea (OMU) and butinol-chloro-phenyl-carbamate (BIPC) in granular form with added calcium nitrate applied post-em. at the 2-leaf stage at 200 kg/ha gave excellent weed control but appeared to depress yield. Calcium cyanamide (18.5% nitrogen), 200-400 kg/ha applied pre-sowing gave poor weed control and at 400 kg/ha significantly reduced yield. Neburon 1.11 kg/ha, simazine 0.25 and 0.375 kg/ha and DNOC (sodium) 2 and 4 kg/ha all applied pre-em. all reduced germination at all sowing depths (1-3 cm) and also yields after resowing of the plots. The effects of the compounds used (excepting OMU-BICP) on Stellaria media, Matricaria chamomilla, Capsella bursa-pastoris, Polygonum aviculare, P. lapathifolium, Anagallis arvensis, Plantago major and Spergula arvensis are tabulated. - D.M.L.S. [96(493)]

15. GREAT BRITAIN. (Sprowston,Norfolk, England). 51st Rep.Norfolk agric.Sta., 1959, pp.23.

p.13. Spraying with a mixture of propham and endothal 1 day before drilling sugar beet gave 98% weed control; the effect of the chemical persisted at least until July. - L.K. [O.W.]

16. KUTUZOV, G.P. The use of herbicides for weed control in fodder beet.] Vest. Selsk.Nauki, 1959, (5),114-8, (Russ.e.g.f.), tabs.4.

In successful trials with PCP 8-12 kg/ha and propham 5-15 kg/ha on fodder beet it was found that neither compound had a deleterious effect on the soil microflora (fungi, microbes decomposing calcium phosphate, ammonifying bacteria, denitrifying bacteria, butyric acid bacteria, Clostridium pasterianum or cellulose decomposing aerobes). In trials with sodium chloride good control of hemp nettle [Galeopsis tetrahit] was obtained but not of fat hen [Chenopodium album] or thistle [Cirsium sp.]; Polygonum sp. was only temporarily affected; wild radish [Raphanus raphanistrum] and shepherds purse [Capsella bursa-pastoris] were severely affected; spurrey [Spergula arvensis] suffered top kill only; only young plants of chickweed [Stellaria media] were affected. The crop showed a greater yield increase when treated at the 2-leaf, than at the 4-leaf stage; 300-500 kg/ha was used. The addition of a wetting agent increased the effectiveness of sodium chloride. Sodium chloride was not found to accumulate in the soil. - L.K. [O.W.]

17. FERNOW, K.H. (Cornell Univ.,Ithaca, New York,U.S.A.) Chemical elimination of volunteer potatoes. Amer.Potato J., 1959, 36,(11),407-9.

Volunteer potato plants constitute a menace to purity of seed production and are also potential vectors of disease. Spraying to run-off with amitrol 9.3 g/l applied on different dates from July 19th to August 30th. gave a nearly complete kill of the tubers.- D.M.L.S. [O.W.]

18. FRANCE. C.R.Assoc.gen.Prod.Mais, 1958, pp.47, (F.), figs.9,tabs.10.

p.17-33. Weed Control. The disadvantages in maize of the rotary hoe, of hoeing, and of the use of growth regulating herbicides (2,4-D) are discussed briefly and general information given on the mode of action and use of simazine.

Simazine trials in maize. Rumex acetosa was seen to be resistant to simazine 6 kg/ha in dry weather but when 20 cm high was killed in 6 days by 2 kg/ha after 80 mm rain had fallen in 4 days. In 1 trial Digitaria sanguinalis was killed when treated pre-em. with 2-3 kg/ha but was resistant to 6 kg/ha applied post-em. Cynodon dactylon appears to be resistant to all rates permissible in maize.

In trials during 1958 (a wet year) simazine 1-16 kg/ha caused no decrease in yield of maize var. INRA 353, yield of Iowa 4417 was slightly depressed by 8 kg and in 1 trial was markedly depressed by 16 kg/ha; and 2-16

kg/ha caused significant yield decreases in vars. INRA 244 and W.255 especially in the latter. It is thought that these results are possibly due to the high rainfall and fertility conditions of the trials. (A Swiss trial has shown that the susceptibility of Agropyron repens to simazine increases with the level of soil fertility). Injury from external damage (in 1 trial frost, in another slugs) was seen to be greatest where simazine rates were highest. The effect of the same amount of rainfall on simazine results was greatest when experienced in heavy falls interspersed with fine weather (i.e. giving good growth conditions). General conclusions from the trials were that in general simazine 1.5-3 kg/ha does not cause maize injury, and if exceptionally it does the slight decrease in yield is compensated for by increased weed control. A comparison of band treatment at 1 kg/ha with overall treatment at 3 kg/ha (both treatments receiving inter-row mechanical cultivation) indicated that band treatment may be advantageous where (1) weeds are not dense or advanced in growth and do not grow late in the season, (2) the inter-row cultivator is provided with disks in order to avoid throwing untreated soil over the treated bands, and (3) where it is desired to follow the treated maize with wheat (a practice not as yet advised). Overall treatment is advised in rainy hot regions where weeds grow thickly and rapidly and are liable to regrow late in theseason , and where maize is the only crop grown and it is desired to clean the ground by repeated treatments.

In 3 trials in 1957-8 mechanical hoeing after simazine did not increase yields; it is suggested however that 1 shallow hoeing when maize is 40 cm high, to break the soil crust after the June rains and to incorporate the last nitrogen dressing, may be advantageous.

Simazine persistence. It was observed that persistence was least in soils of high humus content. In 2 trials in Northern France wheat grown after maize treated with simazine the preceding year showed yield reductions of from 30% after 4 kg/ha to 100% after 8 kg/ha, but no reduction after 2 kg/ha. In 1 trial in S.W. France wheat grew normally after 8 kg/ha applied the preceding year.

Two products have proved worthy of further trials in maize: G30026 which is less persistent than simazine, and atrazine which has given better results than simazine in maize. - D.M.L.S. [11(44)]

19. NETHERLANDS. (Plantenziektenkundige Dienst,Wageningen,Netherlands). Bestrijding van plantenziekten, schadelijke dieren en onkruiden in de landbouw. [The control of plant diseases, pests and weeds in agriculture.] Versl.Meded.Plantenziektenkundige Dienst, 1959, 116,pp.122, tabs.

In this 5th revised edition, after a short introductory section, brief sections are included which give recommendations for weed control in a number of common agricultural and horticultural crops and for potato haulm destruction. A table gives the compatibility of DNOC, dinoseb, 2,4-D and MCPA with a number of insecticides and fungicides (p.67). Herbicides are listed according to the active ingredient; their main characteristics are given and commercial names are listed (p.89-98). Names and addresses of commercial firms and consultants and an index complete the book. - L.K. [O.W.]

20. EL-GIBALY, H. (Dep.Soil Sci.,Fac. Agric.,Ain Shams Univ.) Effect of boron toxicity on mineral constituents of Egyptian berseem. Ann.agric.Sci.Cairo, 1957, 2,109-21.

Toxicity symptoms developed when more than 20 lb/feddan of borax was applied to sandy soil but were not apparent on loam soil unless more than 50 lb were added. - From Soils & Fert., 22,(5),2484. - D.M.L.S.

21. RAHUDKAR, W.B. (Coll.Agric.,Nagpur, India). Weed control in Jowar (Sorghum vulgare) by pre-emergence application of 2,4-D. Ind.J.Agron., 1959, 3,(4),252-3, tabs.2,bibl.2.

In a preliminary trial Sorghum vulgare, sown for fodder, was sprayed with 2,4-D (sodium) pre-em. after irrigation. Plant height was decreased and the number of leaves reduced. Perennial weeds, e.g. Cyperus rotundus and Cynodon dactylon were not affected, but the annual grasses Eragrostis plumosa and Panicum isachne were completely eradicated. - J.W.B. [O.RE.]

22. SPRINGENSGUTH, W. (Pflanzenschutzamt, Landwirtschaftskammer,Westfalen-Lippe, Münster, Germany). Die Bekämpfung des Ackerfuchsschwanzes (Alopecurus agrestis L.) in Klee und Luzerne mit Herbiziden. [The control of blackgrass (Alopecurus myosuroides) in clover and lucerne with herbicides.] Gesunde Pflanze, 1959, 11, (12),231-8, (G.), tabs.3,bibl.3.

A. myosuroides in clover or lucerne cannot be adequately controlled by mowing; with early mowing immature but viable seeds are shed. Monuron 0.03-0.25 kg/ha, TCA 4-20 kg/ha and CIPC (50%) 0.2-10 l/ha were applied to red and white clovers and lucerne in late autumn (crops dormant), early spring (before beginning of growing season) and immediately after the first cut in early summer. Monuron and TCA were insufficiently selective. CIPC gave the best results in late autumn when 2-4 l/ha (depending on weed density) gave excellent control with no crop injury; even where seed was set its viability was 50% of that of untreated plants. CIPC should be applied when the ground is not frozen and when night frosts are not expected (however, light night frosts are without effect). - L.K. [O.W.]

23. WELDON, L.W., TIMMONS, F.L. and GALE, A.F. (Agric.Exp.Sta., Wyoming, U.S.A.) Chemical control of annual weeds in alfalfa and red clover grown for seed production. Mimeo.Circ.Wyo.agric.Exp.Sta., 1958, 100, pp.13, tabs.7, bibl.4.

Pre-em. diuron 2 # gave 97 and 98% control of annual weeds and seedling lucerne the first year of use and 94 and 89% respectively the second year without injuring established lucerne [Medicago sativa]. Monuron 1, 2 and 3 # were satisfactory the first year but had little effect thereafter. Neburon 4 and 6 # gave good control of broad-leaved weeds without injuring the lucerne, but was not as effective as diuron on grassy weeds, nor did it control seedling lucerne. EPTC and CDEC were ineffective. Neither neburon nor diuron significantly affected lucerne seed yields. Post-em. 2,4-DB 2 # gave 90% control of broad-leaved weeds on sandy soil and only 76% on sandy clay loam; on the former soil 2 # was far more effective than 1 #, whereas there was little difference on the sandy clay loam; lucerne seed yields were not significantly reduced on either soil. Dalapon resulted in severe injury to lucerne on both soils.

Pre-em. neburon 2, 4 and 6 # gave 89, 95, and 97% control of annual weeds and seedling red clover without reducing red clover [Trifolium pratense] seed yields. Diuron 1, 2 and 3 # severely damaged red clover although this may have been caused by unusually heavy rain late in spring. CDEC and EPTC were ineffective, possibly due to rain not falling soon enough after application. Post-em. dalapon 4 # + 2,4-DB 2 # gave very good grass control but resulted in severe damage to red clover. 2,4-DB 2 and 3 # almost eliminated broad-leaved weeds but was too toxic to red clover; application in this trial may have been made 1 month too late for optimum weed control with minimum injury.

Pre-em. CDEC 10 #, EPTC 10 #, neburon 4, 6 and 8 # gave significant reductions of broad-leaved weeds in seedling lucerne. Only EPTC 10 # and neburon 6 and 8 # gave a very slight reduction in grasses. Neburon 4 and 6 # reduced weeds >80% and increased lucerne growth >200%, while 8 # gave virtually weed-free plots and 5 times as much seedling lucerne forage. CDAA 5 and 10 #, CDEC 5 and 10 #, and EPTC 2.5, 5 and 10 # gave no reduction in green weight of weeds.

Post-em. 2,4-DB (ester and amine) 1 and 2 # ± dalapon 4 # gave significant reductions in broad-leaved weeds, although in each case the amine gave better results than the ester. Dalapon alone eliminated the grasses but caused severe injury to the lucerne; when combined with 2,4-DB the resulting decrease in competition allowed the lucerne to outgrow this injury and yield 3 times as much forage as the untreated control.

None of the treatments mentioned resulted in decrease in % viability of seeds or affected the % of hard seed. - J.W.B. [18(78.7)]

24. STOVELL, F.R. CMPP for cereal weed control. Span, 1959, 2,(2),71-3, figs.3, tabs.1, bibl.4.

Includes the information that mecoprop may be applied for weed control in grass seed crops from the 2-leaf stage onwards; it is said to be particularly useful in cocksfoot. Promising results are claimed from pre-em. use in rhubarb for the control of winter weeds. - L.K. [O.W.]

HORTICULTURAL, ORNAMENTAL AND PLANTATION CROPS

See also 1,19,24,112,113,133,203.

25. ASHTON, F.M. (Univ., Davis, Calif., U.S.A.) Weed control in lettuce and cole crops. Proc. Calif.Weed Conf., 1959, 11,32-3.

CDEC or propham pre-em. at 4-6 #, applied immediately after planting and before the first irrigation are recommended for weed control in lettuce. CDEC appears to cause a slight reduction in stand and temporary stunting. Due to the volatility of CDEC and propham, excessive soil surface temperatures between the time of application and overhead

irrigation, may result in reduced weed control. - J.W.B. [O.W.]

26. UNTERECKE, Chemische Unkrautbekämpfung in Feldsalatkulturen. [Chemical weed control in lamb's lettuce.] Südtsch. Erwerbsgärtner, 1958, 12,952, (G.)
On the basis of 2 years work it is recommended that half the usually recommended rate of CIPC be applied to the seedbed immediately, or 2-3 days, after preparation and that the crop be drilled in 10-12 days later. The method is said to be highly effective and safe. - From Z.PflKrankh., 66,369. - L.K.

27. WILSON, H.R. (P.O. Box 90, Woodland, Calif.,U.S.A.) Weed control in spinach. Proc.Calif.Weed Conf., 1959, 11,28-9.
Monuron at 0.5-1 # applied pre-em. immediately after planting will give excellent control of most broad-leaf weeds. Higher rates may cause severe damage to spinach or succeeding crops. After 2 years' application of 1 # injury has been observed in tomatoes. NTCA [TCA (sodium)] pre-em. at 10 # can be used to control volunteer barley, wheat and other grasses. Propham applied when spinach is in the 2-4 leaf stage at 4-6 # will give excellent control of chickweed [Stellaria media] and 50-60% control of shepherd's purse [Capsella bursa-pastoris]. Other chemicals under investigation: simazine and chlorpropham have given excellent broad-leaf weed control but at the rates used these have proved toxic to spinach; neburon at 0.5-1 # has so far given good weed control with little or no damage to spinach; dalapon at 2-3 # has given good control of seedling volunteer barley. - J.W.B. [O.W.]

28. DENMARK. Unkrudtsbekaempelse i asparges med monuron (CMU). [Weed control in asparagus with monuron (CMU).] Medd.Statens Forsøgsvirksomhed i Plantekultur, 1959, 631, pp.4, (Dan.), figs.1,tabs.2.
In 4 experiments established "stick" asparagus (var. Dansk Kaempe) treated twice a year for 3 years with monuron 2 and 4 kg/ha outyielded the control; 2 kg gave slightly higher yields and slightly poorer weed control than 4 kg. In 3 experiments, 1 year old "green" asparagus (var. Grosse Blanche) was treated with 1, 2 and 4 kg/ha once a year for 3 years; all treated plots outyielded the control; the best results were again given by 2 kg. It is tentatively recommended that "green" asparagus be sprayed with 2-3 kg/ha after harvest and "stick" asparagus with 1.5 kg/ha in the spring at least 3 weeks before cutting and again with the same amount after harvest. - L.K. [90(489)]

29. DOWNES, J.D., HESLIP, R. and HONMA, S. (Agric.Exp.Sta.,East Lansing, Mich.,U.S.A.) Effect of polyethylene mulches, starter solution and kind of transplant on yields of sweet peppers. Quart.Bull.Mich.agric.Exp.Sta., 1959, 41, 641-7, tabs.3,bibl.11.
In a trial in southwestern Michigan where ordinary cultivation was compared with 1.5 mil mulches of black polyethylene and aluminium pigmented polyethylene on variety Keystone Resistant Giant, there was no consistent difference between the mulched plots in early yields, but they produced significantly less than the cultivated plots. Differences in total yield were unrelated to the mulching or cultivation treatments. Mulching appeared to favour early vegetative development rather than early fruiting. In a trial in central Michigan mulches of the same materials when compared with cultivation produced non-significant increases in the early yield of Yolo Wonder A peppers and greatly increased total yields. Black polyethylene in 4 ft strips with twin rows planted 2 ft apart increased total yield 41% over cultivation and was apparently better than black polyethylene in 2 ft strips. There was no apparent difference between the 2 ft strips of black polyethylene and aluminium polyethylene. - D.M.L.S. [78(77.4)]

30. SHADBOLT, C.A. (Univ.Calif.,U.S.A.) Weed control in celery. Proc.Calif.Weed Conf., 1959, 11,33-4.
Includes the following information:- monuron and diuron severely injured celery, particularly in high rainfall areas. Simazine gave varied results on celery at different locations (which did not appear to be due to moisture or rainfall variability); chlorosis and stunting resulted in yield reduction even at 0.5 #. Neburon at up to 2 # caused no injury or yield reduction and gave 80-100% weed control; at 3-6 # it may cause stunting, particularly early in the season, but no reduction in stand has been observed. Chlorpropham 4-6 # + Stoddard solvent 20 gal in 80 gal of water gave 80% weed control and chlorpropham 4-6 # alone gave 60%, Stoddard solvent 20 gal/ac alone gave 30%. Heart injury to celery was observed in one instance when Stoddard solvent was applied in hot weather. - J.W.B. [O.W.]

31. VERLAAT, J.G. (Proefsta.Groenteteelt, Alkmaar,Netherlands). Onkruidbestrijding in witlof. [Control of weeds in witloof chicory.] Groenten en Fruit, 1959, 14, (46),1390-1, (Du.)
Sulphuric acid and weed oils are recommended for pre-em. use on stale seedbeds; TVO and/or PCP are not recommended. CIPC 2-3 days after sowing is particularly recommended. - L.K. [186(492)]

32. LALIBERTE, J. (Sta.exp.l'Assomption, Quebec,Canada). Essais d'herbicides dans les cultures d'oignons. [Herbicide trials in onions.] Rep.Quebec Soc.Prot. Plants, 1958, 143-7, (F.), tabs.3,bibl.11.
The following were compared with chlorpropham 5 # applied pre- and post-em. in 50 gal water: (1) calcium cyanamide 75 # + potassium cyanate 8-10 # in 60-80 gal water, pre- and post-em. gave better yields in trials over 2 years, but in a third year at 60 + 8 # gave very poor results; (2) liquid cyanamide 5 gal/ac in 40 gal water, pre-and postem. (1 trial only) gave a much higher yield than chlorpropham and slightly higher than the weeded control; (3) EPTC 5 # pre-em. in 64 gal water failed to control weeds; (4) monuron 1 # pre-em. greatly reduced yields in 2 out of 3 years and was obviously toxic to the onions; (5) sodium isopropylxanthate 9 # and (6) Hydrin (mixture of aromatic oils) 6 gal/ac, both applied post-em. in 50 gal water, both in 2 years gave much inferior weed control to chlorpropham but a higher yield in 1 year.
Varsol and calcium cyanamide powder applied pre-em. followed by 1 or 2 post-em. treatments with potassium cyanate were no, or only slightly, superior to the latter applied post-em. without them. - D.M.L.S. [O.W.]

33. PURNELL, D.C. (Univ., Davis, Calif., U.S.A.) Chemical weed control in onions. Proc.Calif.Weed Conf., 1959, 11,35-7.
In tests conducted in 1957 on direct-seeded and transplant onions, potassium cyanate was applied at 6, 12, 18 and 24 # in 50 gal of water; the best weed control with no damage to onions was given by 18 #. Dinitro selective [dinoseb] 6 quarts/ac in 60 gal of water gave good weed control but onion foliage was burnt.
In 1958, several compounds were applied to Flat Italian Red onions over a 1 ft band in 300 gal/ac; no weeds were obvious at the time of application; rain fell within a few hours of treatment and continued intermittently for 6 weeks. Lambsquarters [Chenopodium album] and mustard [Brassica spp.] were completely controlled by neburon 2 and 4 #; CIPC 2, 4 and 6 # gave very good control; while CDAA 4 and 8 # and CDEC 3, 6 and 9 #, although not so effective, gave significantly lower counts than the check. Puncture vine [Tribulus terrestris?] was completely controlled by neburon 2 and 4 #; CDEC 3, 6 and 9 # gave very good control, while CIPC 2, 4 and 6 # and CDAA 4 and 8 # gave poorer but significant control. All treatments gave appreciable control of filaree [Erodium cicutarium] but the number of plants on the plots was too small to show differences between treatments. Yield (expressed as wt/bulb) on the plots treated with CDAA, CDEC, CIPC and neburon was significantly higher than the check plots at the 5% level. Simazine 3 and 6 # gave complete weed control but all onion plants died before reaching maturity. - J.W.B. [O.W.]

34. DETROUX, L., de FAESTRAETS, L. and LAVALLEYE, M. (Sta.de Phytopharmacie de l'Etat, Gembloux,Belgium). Essais de desherbage chimique des cultures de pois (Pisum sativum). II. Essais precisant les conditions d'emploi du neburon et du simazin. [Chemical weed control trials in peas (P. sativum). II. Trials to determine the conditions for use of neburon and simazine.] Parasitica, 1959, 15,(3), 89-107, (F.), tabs.7,bibl.2.
Trials in 1958 confirmed the value (already demonstrated in 1957) of neburon and simazine as pre-em. herbicides in peas and showed them to be superior to dinoseb and MCPB (applied post-em.) in efficiency, safety, durability, greater range of application and (especially simazine) in grass control.
For an average soil the recommended dose for simazine is 0.25-0.375 and for neburon 1.8-2.2 kg/ha (even lower rates of neburon may be used under favourable conditions). Weeds well controlled included: Raphanus raphanistrum, Stellaria media, Sinapis arvensis, Chenopodium sp., Matricaria chamomilla, Capsella bursa-pastoris, Papaver rhoeas, Mercurialis annua and Spergula arvensis. When applied 12 days after sowing germination of Gloire de Quimper peas was not affected by neburon 1.1 and 4.4 kg/ha or by simazine 0.25-0.5 kg/ha and no injury was caused by the simazine (in contrast with 1957 when 0.5 caused slight temporary injury to 5% of the crop), while neburon caused only slight temporary injury (none in 1957). MCPB 1.6 kg/ha post-em. also caused no injury. All compounds were applied in 800 l water/ha. Significant yield increases over those of the hoed control were obtained by dinoseb (armonium) 0.945 kg/ha applied post-em.,by simazine 0.25-0.5 and by neburon 4.4 kg/ha and non-significant increases by neburon 1.1 kg/ha

and MCPB 1.6 kg/ha. 1 hoeing, 11 days after applying neburon, caused a slight yield increase over the unhoed neburon plots and appeared to enhance the effect on weeds. Spinach, var. Monstrueux de Viroflay, sown after ploughing and harrowing and 101 days after applying the simazine and neburon grew normally. Analysis of the soils from the different localities where neburon and simazine were tried indicated that the pH and humus content had no effect on the results. Mediocre and bad results were most frequent on sandy soils; results on limey soils were in general very satisfactory. - D.M.L.S. [O.W.]

35. GREAT BRITAIN. (Pea Res.Sta.,Yaxley, Peterborough,England). Rep.Pea Growing Res.Org.1958, 1959.

p.12. Varietal susceptibility to herbicides. Propham, CIPC + fenuron, dinoseb (ammonium), TCA + dinoseb and MCPB were applied to peas on a heavy loam and a peaty-silt soil at 50% above the optimum rate, at the recommended time. The varieties were: Dark Skin Perfection, Gregory's Surprise, Kelvedon Wonder, Lincoln, Meteor, Onward, Rondo, Thomas Laxton, Victory Freezer, Witham Wonder and Zelka. The only case of serious injury was where Zelka was sprayed with TCA. No taint was detected in canned peas from plots treated with propham, TCA, CIPC + fenuron or MCPB at either site.

p.16-17. Wild oat control. In 4 detailed experiments TCA 7 # and propham 3 and 5 # were applied (1) ca. Feb. 20th or (2) early March each, (3) with or (4) without additional cultivation before normal seedbed preparation. With TCA the least damage was caused by (1, 3). Propham gave poorer control of wild oats [Avena fatua] and rate and time of application had little effect - it proved quite effective on Polygonum spp. On observation plots at 2 centres CDAA and CDEC 12 # pre-sowing again gave poor control. In farm observation plots propham 3 # was applied to a wide range of vining and threshing varieties. Yields, where taken, were increased even though stands were reduced. The kill of wild oats varied from 50% where the original infestation was <5/yd^2 to 73% where it was heavier. No clear relationship was found between effects on crop and wild oats, and soil type, pH, variety, date of spraying, pre-drilling cultivations or time between treatment and sowing.

p.17. Chemical weed control. CIPC + fenuron and 2,4-DES were applied to 5 varieties of vining and threshing peas pre-em. in 100 gal water/ac at the recommended and twice the recommended rate; none gave satisfactory weed control and none caused taint. Sodium monochloroacetate (85%) 20 and 40 # in 20 gal water/ac at the 4-leaf stage caused appreciable scorch and gave only fair weed control. PCP and cresylic acid pre-em. were only partially satisfactory. - L.K. [O.W.]

36. COLLINS, W.B. Chemical weed control. Horticultural crops. Progr.Rep.exp.Fm Fredericton, N.B., 1953-7, 1959, pp.43-4.

Materials showing promise when applied pre-em. to peas, beans and sweet corn were dinoseb, neburon, Mylone [DMTT] and simazine, but the last 2 were toxic to beans.

In trials with newly set strawberries, of 12 materials tested during the past 5 years, 2,4-DES was effective when applied early in the planting year at rates of 2-4 # in 50 gal water. Other promising, but insufficiently tested, materials were EPTC and V.P.M. [SMDC?]. - From Hort. Abstr., 29,3529. - J.W.B.

37. DETROUX, L. (Sta.Phytopharmacie, Gembloux,Belgium). Le desherbage des cultures de legumineuses a grosses graines. [Weed control in large-seeded legumes.] Rev.Agric.Brux., 1959, 12,(7-8),3-8, bibl.3.

Gives recommendations for the use of neburon, simazine and calcium cyanamide pre-em., and dinoseb, MCPA and MCPB post-em., in peas, and for the same compounds (excepting MCPA and MCPB) in French and broad beans. The recommended rate for pre-em. applications of neburon in all 3 crops is 1.5-2.5 kg/ha. For simazine it is 0.25-0.35 kg/ha in peas and French beans and up to 0.3 kg/ha in broad beans. All 3 crops may be injured by higher rates of simazine; yields of broad bean and French bean may be reduced by 0.5 kg/ha and of peas by 1 kg/ha. It is emphasized that simazine cannot as yet be recommended for general use. - D.M.L.S. [97(493)]

38. DETROUX, L., de FAESTRAETS, L. and LAVALLEYE, M. (Sta.de Phytopharmacie, Gembloux,Belgium). Le desherbage chimique des cultures de haricots (Phaseolus vulgaris). III. Essais precisant les conditions d'emploi du neburon et du simazin. [Chemical weed control in beans (Phaseolus vulgaris). III. Trials to determine the conditions for use of neburon and simazine.] Parasitica, 1959, 15,(3),108-20, (F.), tabs.5,bibl.4.

In trials in 1958 neburon 1.1 and 4.4 kg/ha and simazine 0.25, 0.375 and 0.5 kg/ha, in 800 l water/ha, applied on 21st May 1 day after sowing Double Princesse de Hollande

beans, caused no injury and had no significant effect on yields. Weed control from neburon 4.4 kg/ha and from the 3 simazine rates was satisfactory and superior to that obtained from dinoseb (ammonium) 0.81 kg/ha applied 10 days post-em; the dinoseb was less satisfactory than 1 hoeing 3 weeks after sowing. Plots hoed 19 and 50 days after applying neburon 2.2 kg/ha pre-em. in 2 bean varieties, showed notably better weed control than the treated unhoed plots; yields from unhoed plots, both treated and untreated, were inferior to those hoed. While less effective in beans than peas, owing to the later season and therefore greater weed growth, neburon 1.8-2.2 kg/ha followed by 2 hoeings should give satisfactory results superior to those from dinoseb or from cultivations without chemicals. Simazine is less safe than neburon (in 1957 injury was caused by 0.5 kg/ha); rates of 0.25-0.375 would seem to be indicated, but it is premature to recommend its use. - D.M.L.S. [O.W.]

39. CARLETON, R.M. Your lawn - how to make and keep it. Princeton,N.J.,U.S.A., (n.d.), pp,150, £1.10.0.
A practical and up-to-date book covering all problems including weed control. - D.M.L.S.

40. GREAT BRITAIN. The control of seaside chickweed. Sports Turf Bull., 1959, 47,6-7.
Good control of seaside chickweed (Cerastium semidecandrum) seedlings may be obtained with calcined sulphate of iron at 150 # preferably in the autumn. The application should be made on a settled day where there is dew or moisture on the grass. When treatment is made in March, to prevent excessive scorch to the grass, if rain does not fall within 4 days after treatment, the greens should be artificially watered. It is advisable to use sulphate of iron with discrimination on greens where the soil is known to be rather acid as it tends to cause even greater acidity. - J.W.B. [386(42)]

41. BING, A. (Ornamentals Res.Lab., Farmingdale, N.Y., U.S.A.) What is new in weed control on glads? Bull.N.Amer. Gladiolus Counc., 1959, 58,69-75.
Summarises research on chemical weed control in gladiolus plantings in commercial plantings, and by manufacturers, and State and Federal Experiment Stations. Per acre dosages of 6-8 quarts dinitro, 2 lb diuron and 2-4 lb simazine as pre-em. treatments were the most widely successful herbicides. Post-em. treatments included 3-4 lb 2,4-DES and 0.5-1.5 lb diuron. - Biol.Abstr., 34, (3),8480.

42. BING, A. (Ornamentals Lab., Farmingdale,N.Y., U.S.A.) The latest on Gladiolus weed control. Bull.N.Y.St.Flower Grs, 1959, 159,pp.2, tabs.2,bibl.2.
Includes a table listing materials suggested for trial use in Gladiolus spp. - J.W.B. [123(74.7)]

43. BING, A. (Ornamentals Lab., Farmingdale,N.Y.,U.S.A.) No need for weed in cymbidiums. Bull.N.Y.St.Flower Grs, 1959, 158,pp.2, bibl.3,tabs.
At 5 # Karmex DW [diuron] safely controls weeds in cymbidiums. Repeat applications may be necessary after 8-12 months. - J.W.B.

44. BLASZYK, P. Zur chemischen Unkrautbekämpfung in Blumenzwiebeln. [Chemical weed control in flower bulbs.] Gartenwelt, 1959, 59,49-51.
In a 4 year series of experiments on weed control in tulips, excellent results were obtained by spraying in February, when the shoots were about 2 cm high, or in April, when they had reached 10-15 cm with a chlorpropham product at 6 l/ha in 800 l of water. A similar half-strength product used at double this concentration was equally effective. December treatment was less successful. A dust preparation of chlorpropham, 25% richer in active material than the fluid, applied at 40 kg/ha mixed with superphosphate, was as effective as the spray when applied in April, but far less so in the earlier applications, and the tulips died after the February treatment. Allipur, a commercial mixture of urea derivatives and the ester of carbamino acid, sprayed in April at 8 l/ha was as effective as chlorpropham. Simazine dust, applied at the same rate and times as chlorpropham dust, gave excellent results, even from the December treatment. In solution at 2 kg/800 l/ha, however, application in December gave poor results, but in spring good control was achieved within a month. For weed control in narcissi chlorpropham at the above rate gave poor results in autumn, but was very effective in early April, either as dust or spray, and simazine was equally good, giving better control than chlorpropham of cudweed (Gnaphalium spp.). In narcissus and crocus propagation beds chlorpropham at 8 l/600-800 l of water gave good results when applied soon after removal of the straw cover. Even flowering crocuses were unharmed by spraying. Weeds showing resistance to chlorpropham included

groundsel (Senecio vulgaris) and hemp-nettle (Galeopsis sp.). - Hort.Abstr., 29,2388.

45. DENMARK. Forsøg med ukrudtsbekaempelse i tulipaner 1956-59. [Experiments on weed control in tulips 1956-59.] Medd. Statens Forsøgsvirksomhed i Plantekultur, 1959, 629,pp.4, (Dan.), tabs.3.
In 4 years trials the following were applied to various varieties of tulips at 2 locations in mid-November: DNOC (2.5%) 250 l/ha, Sevtox [dinoseb] 14 l + 100 l diesel oil + 400 l water/ha, Aamergens [PCP] 100 l + 400 l water/ha, B.A.C.-1122 80 l + water 420 l/ha, chlorpropham 4 l + 500 l water/ha; the latter was also applied in the spring after germination of the tulips. Most of the treatments gave satisfactory weed control but some were inconsistent from year to year. The following treatments are regarded as the most promising (generally outyielding the control):- Sevtox, Aamergens, B.A.C.-1122 and chlorpropham applied in the autumn.- L.K. [89(489)]

46. KOPPES, S. and ONDERWATER, L.N. De motorrugnevelspuit. [The motor knapsack mist sprayer.] Weekbl.BloembolCult., 1959, 69,662, figs.
Recommendations are given on the use of this sprayer in bulb crops. Chlorpropham was successfully applied by the sprayer. An economic size of holding for the use of such a sprayer is 4 or 5 ha. - Hort.Abstr., 29,3184.

47. NYHLEN, A. (Statens Trädgårdsförsök, Nyckelby,Sweden). Kemisk ogräsbekämpning till blomsterväxter. [Chemical weed control in flowers.] Arsb.S.H.T.F:s, 1958, pp.7, (Sw.), figs.5.
Gives the results of 1 year's pre-planting and post-em. experiments in the greenhouse and field in which a number of ornamentals were treated with: Alanap 1 [90% NPA] 4 kg/ha (1), allylalcohol 100 l/ha (2), monuron ca. 3 kg/ha (3), Premin [30% dinoseb?] 8 l/ha (4), Rensa [20% 2,4-DES] 6 kg/ha (5), simazine 2 kg/ha (6), amitrol 5 kg/ha (7), SMDC 100 l/ha (8) and Weed-killer (an oil) 600 l/ha (9). In the pre-planting tests promising results were given on: (a) freesia by 3 and 7, (b) anemone by 2, 7, 4, 5, 8 and 9, (c) gladiolus by all compounds, (d) chrysanthemum by 2, 4, 5, 8 and 9, (e) stocks by 2, 4, 5, 8 and 9, (f) carnations by 1, 2, 4, 5, 8 and 9, (g) Viola cornuta by 1, 4, 5 and 8. Only monuron appeared to be injurious to delphiniums. In the post-em. trials promising results were given in (a) anemones by 8, (b) stocks by none, (c) chrysanthemum by 5, (d) carnation by 4, 5, 6, 7 and 8, (e) gladiolus by 1, 5 and 8, and (f) Viola cornuta by 1, 5, 8 and 9. Monuron 0.4 kg/ha, Premin 4 l/ha, Rensa 2 kg/ha and simazine 1 kg/ha were applied to roses post-em. without causing injury and monuron 0.8 kg/ha, Premin 12 l/ha and simazine 1 kg/ha to freesia post-em. without injury. - L.K. [160(485)]

48. RIES, S.K., GRIGSBY, B.H. and DAVIDSON, H. (State Univ.,E.Lansing,Mich., U.S.A.) Evaluation of herbicides for several species of ornamentals. Weeds, 1959, 7,(4),409-17, figs.2,tabs.10, bibl.11.
When applied in June 2-3 days after transplanting 2 year old Cotoneaster acutifolia, Syringa chinensis, Taxus cuspidata (capitata) and Taxus media 'Hicksi', commercially acceptable weed control (the main weeds were Chenopodium album, Amaranthus retroflexus, Portulaca oleracea, Ambrosia artemisiifolia and Digitaria sanguinalis) without crop injury was given by 2,4-DES 4 ± NPA 4 # and by simazine 2 and 4 #; acceptable weed control but with injury to the crop was given by monuron 1 #, diuron 1 + 2,4-DES 4 # or ± dalapon 5 # and by amitrol 6 #; poor weed control but no injury was given by NPA 4 #, EPTC 6 #, CDEC 4 # and dalapon 5 #. No further injury was caused when the above plots were sprayed with simazine, 2,4-DES or noburon (all at 4 #) the following June; only simazine gave good weed control.
DMTT 0.75 lb/100 ft^2, SMDC 1 lb/100 ft^2 and methyl bromide 1 lb/100 ft^2 were applied and watered in immediately with 1 in. of water about 2 weeks before planting out Euonymus fortunei vegetus (1), Juniperus chinensis pfitzeriana, Forsythia intermedia (2), Pyracantha coccinea (3) and Tulipa sp. 5 days later simazine 4 # was applied to separate plots. All compounds gave excellent control of Stellaria media, Capsella bursa-pastoris, Rumex acetosa and Trifolium repens (except methyl bromide of Trifolium). The best weed control was given by simazine and this was the only compound to cause any crop injury - it caused severe injury to 1, 2 and 3.
In a greenhouse test simazine 4 #, propazine 4 #, trietazine 4 #, dalapon 10 + simazine 4 # and dalapon 20 # were applied to the following species (the

treatments causing injury are given in parentheses):- Juniperus chinensis pfitzeriana, Taxus cuspidata (dalapon + simazine), Hedera helix (dalapon + simazine), Pachysandra terminalis (simazine, dalapon + simazine), Euonymus fortunei (propazine, dalapon + simazine). In a supplementary test on Juniperus, Hedera, Euonymus and Hemerocallis only the latter was not more severely affected by 8 # than 2 # of simazine; however, in all cases the differences appear to have been slight.

In an extensive test made by selected growers simazine was compared with neburon and 2,4-DES on woody ornamentals. Simazine gave much the best results. Based on this survey 30 spp. are classed as resistant and 7 as susceptible to simazine.

From observations made in the greenhouse test it is suggested that dalapon and simazine may react synergistically. - L.K. [O.W.]

49. UNITED STATES. Wash.Res.Progr.Hort., 1959, 9,pp.8.

p.7. Simazine 5 lb gave very good control of quackgrass and annual weeds in 3 year old Woodwards arborvitae [Thuja occidentalis var. Woodwardii?], Cynthia rhododendron [Rhododendron sp.] and Mediterranean Hybrid heather [Calluna sp.]; 10 lb almost eliminated quackgrass [Agropyron repens] for 8 months. Both rates caused some chlorosis to Japanese yew [Taxus cuspidata] and the higher rate caused slight growth reduction of the heather. Simazine + dalapon, or + amitrol gave good weed control but injured the nursery stock. When applied 1 month after planting out rooted cuttings, simazine at 1-8 # did not damage Woodwards arborvitae, Cypressyano-viridus, Japanese holly [Ilex crenata], English holly [Ilex Aquifolium] and English yew [Taxus baccata]; 8 # injured Laurestinus [Viburnum Tinus], Potentilla, Springwood White heather [Calluna sp.], and Wintercreeper Euonymus [Euonymus sp.]; 8 and 4 # injured Caroline azalea [Rhododendron carolinianum?], Japanese andromeda [Pieris japonica?], Autumn Glory veronica and Cypress veronica [Veronica spp.]; granular simazine 4 lb a.i. material appeared promising; neburon at 3 and 6 lb gave moderate and good weed control respectively; neburon at 6 lb caused damage to Laurestinus, Cypress veronica, Caroline azalea, Wintercreeper euonymus, and Japanese andromeda.

Simazine 3 and 6 # applied for 2 years in May has given excellent weed control for 9 months with no serious damage to Woodwards arborvitae, Rock Cotoneaster [Cotoneaster sp.], Mediterranean Hybrid heather, Cynthia rhododendron, and Japanese yew, although slight chlorosis to the latter species occurred with both rates. Neburon 3 and 6 # gave moderate and good weed control respectively for 4 months although slight to moderate chlorosis of Japanese yew occurred with both rates.

Simazine and neburon applied at low rates in May caused slight damage to Shasta daisy, pansy, chrysanthemum, ajuga and primrose in July but complete recovery was made by September. DMTT, neburon, granular simazine and granular NPA, EPTC (granular and emulsifiable) gave good summer weed control with no damage to marigold, petunia and zinnia. - J.W.B. [45(79.7)]

50. BYLTERUD, A. and RUSTEN, A. (Statens Plantevern,Vollebekk,Norway). Forsøk med kjemiske midler mot ugras i planteskolene. [Chemical weed control trials in nurseries.] Gartneryrket, 1959, 49,(10),162-8, (Nor.e.), figs.4,tabs.6.

In a pre-em. trial on Berberis thunbergii no injury of any importance was caused by white spirit and/or turpentine sulphate or by simazine 0.5 kg/ha. 2,4-DES,NPA, propham and chlorpropham all at 10 kg/ha were applied in the autumn about 1 year after sowing Cotoneaster lucida, B. thunbergii and Rosa rugosa; the only compound to cause any injury was chlorpropham and in the case of C. lucida and B. thunbergii this was quickly outgrown. 2,4-DES 5 and 10 kg/ha, NPA 5 and 10 kg/ha, propham and chlorpropham both 10 and 20 kg/ha were applied in the autumn to transplanted Spiraea japonica, Cornus alba, S. margaritae, Forsythia intermedia, B. ottawensis, Kolkuitzia amabilis, Viburnum opulus roseum, Philadelphus sp., Cotoneaster lucida, Picea abies and S. vanhouttei; the only compound to cause more than temporary injury was chlorpropham. Simazine 1 kg/ha applied in May did not adversely affect Picea glauca. Ribes nigrum cuttings treated in May or July (i.e. before or after rooting) with propham 5 kg/ha, 2,4-DES 5 kg/ha, propham 2.5 kg + 2,4-DES 2.5 kg/ha or simazine 0.5 and 1 kg/ha were not injured; the compounds also caused no injury to transplanted Spiraea bumalda Froebelii, Potentilla fruticosa, S. vanhouttei, S. arguta, B. thunbergii or Ribes rubrum. Good control of Matricaria spp. was given by turpentine sulphate, simazine, 2,4-DES + propham and NPA; fair control by propham and chlorpropham and poor control by white spirit + turpentine sulphate. All compounds except 2,4-DES + propham gave good control of Poa annua. Capsella bursa-pastoris was well controlled only by 2,4-DES, NPA, CIPC and propham + 2,4-DES. Stellaria media was well controlled by NPA, propham + 2,4-DES and chlorpropham. Senecio vulgaris was not controlled by white spirits and/or turpentine nor by propham but was controlled by the other compounds (only moderately well by chlorpropham). Draba verna proved susceptible to

2,4-DES, NPA and chlorpropham and moderately so to propham. Myosurus minimus was susceptible to 2,4-DES and/or propham, NPA and chlorpropham. Sonchus asper was resistant to 2,4-DES and/or propham but not to chlorpropham. Gnaphalium uliginosum was controlled by simazine but not by propham + 2,4-DES. Simazine controlled Chenopodium album. - L.K. [53(481)]

51. BRITT, K. (Univ.,Davis,Calif.,U.S.A.) Pre-emergence weed control in container grown nursery stock. Proc.Calif.Weed Conf., 1959, 11,84-7, tabs.1.
Neburon 4, 8 and 16 # and/or simazine 2, 4 and 8 # were applied separately, before weed emergence, to 1 gallon cans planted with 65 ornamental species; the cans were hand-weeded before the applications where necessary. Neither of the herbicides inhibited weed seed germination but they both had a toxic effect on the young seedlings. The experiments showed that weed control could be obtained for periods of 3 to 5 months. The results with neburon 16 # and simazine 8 # are not discussed since these rates were often injurious and are higher than would generally be necessary for good weed control. The following species were severely retarded or killed: Alsophila australis, Bougainvillea "Convent", and Xylosma senticosa by neburon 4 and 8 # and simazine 2 and 4 #; Ceanothus thyrsiflorus by neburon 4 and 8 #; Mahonia aquifolium, Sedum sieboldi, and Viburnum tinus robustum by neburon 8 #; Escallonia organensis, Hebe spp., Lonicera halliana, Sedum sieboldi, and Tetrapanax papyrifera by simazine 2 #. - J.W.B. [O.W.]

52. CARTIER, R.D. and COITEUX, F. (Bur. Prot.Plantes,306 est, rue Craig,Montreal, Canada). Le controle des mauvaises herbes dans les pepinieres sylvicoles. [Weed control in forest nurseries.] Rep.Quebec Soc.Prot.Plants, 1958, 81-3, (F.)
Weeding (hand + mechanical) costs $400-450/ac a season for forest seedlings and ca. $ 250/ac for seedlings already planted out. The normal chemical treatment with mineral oil is described. The following applied pre-em. in seedings of Pinus resinosa and Picea mariana gave very good weed control (the chief weeds were Stellaria media, Chenopodium album, Amaranthus retroflexus, Capsella bursa pastoris, Taraxacum officinale, and Cyperus esculentus) and are placed in order of efficiency: Premergeldinoseb (alkanolamine) 53%] 1 gallon, EPTC 8 lb, chlorpropham 4 lb, dalapon 8 lb, chlorpropham (granular) 5% 160 lb. Seedling density appeared slightly reduced in the EPTC and dalapon plots but factors other than the weedkillers were thought to be responsible. - D.M.L.S. [O.W.]

53. ARMSTRONG, S.M. Experience with one pre-emergence herbicide. Nat.hort.Mag., 1959, 38,118.
Granular 5% chlorpropham successfully controlled elm [Ulmus spp.] seedlings and annual weeds without injury to Ilex crenata, I. cornuta, Viburnum carlcephalum, Glen Dale hybrid azaleas [Azalea spp.], Mahonia bealei, M. aquifolium, Photinia serrulata, Camellia japonica, Juniperus spp., Vinca minor, Hedera helix and Liriope spicata. - Hort.Abstr., 29, 3517.

54. BRUCE, D. Effect of low competition on Longleaf pine seedling growth. Proc. Soc.Amer.For., 1958, 1959, 151-3.
In small-scale tests in S. Mississippi, scalping and methods of burning that kill grass roots, particularly log burning, reduced competition and promoted growth more effectively than herbicides (allyl alcohol, TCA and others being tried). - From For.Abstr., 20,4534. - J.W.B.

55. MULLER, J. and MULLER, Z. Uvedeni nove pestebni techniky pouzitim herbicidio do lesnicke prakse v zahranici. [New methods of silviculture using herbicides employed abroad.] Lesn.casop., 1958, 4,(2),116-28, (Czech.), bibl.65.
A review of the literature on the use of herbicides for weed control in forest nurseries, forest plantings and forests; for brush control; and for the establishment of desirable spp. in natural plantings. - Ref.Zh.Biol., 1959, 88462.

56. CEAPOIU, N. Cinepa. Studin monografic. [A monograph on hemp.] 1958, pp.734, Academy Rumanian People's Republic. (Rumanian,russ.g.), bibl.486.
Chapter 9 is concerned with cultural measures for the production of fibre alone, seed alone, and for fibre and seed combined. - From Field Crop Abstr., 12,(4), 2078. - D.M.L.S.

57. FOY, C.L. (Exp.Sta.,Univ.,Davis, Calif.,U.S.A.) Combined use of pre-emergence herbicides and cross-cultivation in cotton. Weeds, 1959, 7,(4),459-62, figs.1,bibl.8.
Chlorpropham 6.6 # in 40 gallons applied pre-em. to 12 in. bands gave economic and

efficient control of Digitaria sanguinalis and other weeds in cotton (var. Deltapine 15) on a sandy loam. Cross-ploughing was more effective than hand-thinning and drilling but delayed the maturity of the crop. Optimum results were obtained from CIPC pre-em. and cross-ploughing. None of the treatments had any significant effect on yield of cotton seed. - M.E.L. [O.W.]

58. PAESLER, F. Die Unkrautflora unserer Weinberge. [The weed flora of our vineyards.] Dtsch.Gärtner-Post, 1957, 9,(35), pp.2, (G.)
With reference to central Germany. - L.K.

59. BOYNTON, D. and YATSU, L. (Cornell Univ.,Ithaca,New York,U.S.A.) Effects of maleic hydrazide sprays on growth, fruiting and nitrogen metabolism of Sparkle&catskill strawberry plants. Proc.Amer.Soc.hort. Sci., 1959, 73,174-80, tabs.4,bibl.4.
Includes a table showing the effect of MH on the amino acids content of the youngest mature leaves. The most striking effects were reductions in glutamic acid and tyrosine and increases in asparagene and pipecolic acid. In all, the effects on 17 amino acids are tabulated. - L.K. [O.BO.]

60. CATT, D.G. (Bugges Insecticides, Sittingbourne,Kent,England). The pitfalls to be avoided. Grower, 1959, 52,(14), 704-5, figs.1.
Chlorpropham + 2,4-DES applied to clean soil as a residual herbicide in November or early December is recommended for general weed control in bush and cane fruits. Dalapon ca. 4-6 # may be added where couch grass is a problem. In strawberries it is recommended that the first application of chlorpropham + 2,4-DES be made between mid-November and mid-December, the second in May (when flowering starts) and the third in July-August (after harvest). In the very dry conditions of this year inconsistent results have been obtained. The mixture should be applied in at least 100 gallons water/ac and made in a single pass. - L.K. [O.W.]

61. SCHWARTZE, C.D. (Inst.Agric.Sci., State Coll.,Washington,U.S.A.) A chemical hoe for red raspberries. Sta.Circ.Wash. Agric.Exp.,1959, 354, figs.3,bibl.2.
Diuron eliminates weeds but not suckers in red raspberries. Both suckers and annual weeds were controlled chemically with a mixture of dinoseb and diesel oil. Suckers should be sprayed when < 3 in. high and then at intervals of 10 days to 2 or 3 weeks, depending on the density of growth. Perennial weeds were killed to soil surface. A tractor mounted hooded sprayer for use in this connection is described and illustrated. - M.E.L. [44(79.7)]

62. SHAULIS, N. and JORDAN, T.D. Chemical control of weeds in New York vineyards. Ext.Bull.N.Y.State Coll.Agric.(Cornell Univ.) Ext.Cornell, 1959, 1026, (rev.), pp.16, figs.3,tabs.3.
Diuron, monuron and emulsions of aromatic oils + dinoseb in water are recommended for vineyard weed control. Details of their application are discussed, including rates to use, calibrating and cleaning the sprayer, cost, and the equipment necessary. - J.W.B. [121(74.7)]

63. HOBBIS, E.W. and COLES, J.S. (Agric. Res.Sta.,Long Ashton,Bristol,England). The destruction of apple tree stumps and roots by chemical means. Rep.agric.hort.Res.Sta. Bristol, 1958, 59-61, tabs.1,bibl.2.
The following were applied to holes 4 in. deep and 1 in. in diameter drilled in the stumps (average diameter 17 in.) of 51-year old apple trees: aqua regia (1 part concentrated nitric acid, 4 parts concentrated hydrochloric acid by volume) 51.6 ml/hole, caustic soda (flakes) 35 g/hole, bleaching powder 28 g/ hole, and fertilizer (3 parts nitro chalk, 1 part superphosphate, by weight) 44.5 g/hole. The number of holes/stump averaged 7. Four years later the fertilizer was the only treatment that had induced softening of the wood. Caustic soda was the least effective. - Partly From Authors' Summary. - D.M.L.S. [O.RE.]

64. HOLM, L. R., GILBERT, F.A. and HALTVICK, E. (Univ.,Madison 6,Wisconsin,U.S.A.) Elimination of rodent cover adjacent to apple trees. Weeds, 1959, 7,(4),405-8, figs.1,tabs.2,bibl.4.
Applications of monuron and diuron in the spring at 10 # round the base of apple trees gave complete control of vegetation including Agropyron repens and Poa spp. for 2 seasons. Of the 150 trees treated, representing 7 varities and 10 different locations, no damage occurred to trees or to quality and yields of fruit followingtreatments by diuron at rates up to 60 # or monuron at 10 # annually for 4 years. - M.E.L. [O.W.]

65. KARNATZ, H. Chemische Unkrautbekämpfung in Obstanlage und Baumschule. [Chemical weed control in orchard and nursery.] Mitt. ObstVersuchringes Jork., 1959, 14, 43-7.
In pome fruit, both in the nursery and in the orchard, as well as in raspberries, gooseberries and red, but not black, currants, good weed control, without injury to the crop, was obtained with simazine applied in the spring at the rate of 5 kg/ha. Cultivation of the soil before spraying made the treatment more effective. Hoeing after spraying also assisted where weeds were growing under the bushes. As the chemical does not affect the foliage of top or small fruit, special precautions in its application are not required. - Hort.Abstr., 29, 2379.

66. LIFSHITZ, N. (Plant Prot.Dep. Min.Agric., Jerusalem, Israel). Chemical control of Cynodon dactylon in citrus. (Preliminary trials). Hassadeh, 1958, 38, (8), 788-90, tabs.1.
In preliminary unreplicated experiments amitrol 5-10 kg/ha and monuron at 24 kg/ha gave selective control of Cynodon dactylon in 3.5 year old Shamouti orange groves. Monuron 32 kg/ha and dalapon (sodium) at 10-15 kg/ha were also effective but caused temporary injury to the trees. Dalapon was more effective when applied in the spring than in the autumn; for amitrol the reverse was the case. A period of at least 10-14 days between spraying and sprinkler irrigation appears to be necessary to avoid damage to the trees. - M.E.L. [24(569)]

BIOLOGY OF WEEDS AND POISONING BY WEEDS

See also 13.

67. AGNEW, A.D.Q. The ecology of British rushes with special reference to the invasion of re-seeded pastures. Ph.D.Thesis, Univ. Wales, 1957, pp.132, (excl.F & T), figs.43, tabs.23, bibl.48.
This study deals almost entirely with Juncus effusus and covers the morphology, germination, dispersal and distribution of the seed, morphology and anatomy of the seedling and adult, general ecology, ecology of the clumped and unclumped habits and the establishment and spread of J. effusus in pastureland. The effects of agricultural treatments (excluding herbicidal) on the spread is discussed briefly. - D.M.L.S. [BN.U.]

68. ANANT RAO, N.K., AGARWAL, J.P. and KAUSHIK, B.K. (Dep.Agron., B.R.Coll., Agra, India). Effect of weedicides on nut grass (Cyperus rotundus) shoots. Ind.J. Agron., 1959, 4, (1), 48-9, tabs.1, bibl.4.
In a preliminary pot trial in which Cyperus rotundus was sprayed at the 3-5 leaf stage, amitrol 12 and 16 # killed the weed while 2,4-D 2-6 #, TCA 8-16 # and amitrol 8 # were followed by regrowth within 60 days. - L.K. [O.RE.]

69. BAKSHI, T.S. and COUPLAND, R.T. An anatomical study of the subterranean organs of Euphorbia esula in relation to its control. Canad.J.Bot., 1959, 37, (4), 613-20, figs.6, bibl.16.
The organs are described in detail and sections illustrated. Features apparently significant in relation to the persistence of E. esula include the formation of several-layered cork, the accumulation of starch in various tissues of the subterranean organs, the development of a continuous ring of pericyclic meristem in roots, and the characteristic growth of lateral organs from this meristem. The study revealed that tissue differentiation in primordia of lateral organs developing on roots does not take place while the primordia are within the parent organ. This appears to suggest that the primordia, until their emergence from the mother root, are capable of forming either a root or a stem. - D.M.L.S. [O.R.]

70. BUCHHOLTZ, K.P. (Agric.Exp.Sta., Madison, Wis., U.S.A.) Does quack grass manage your farm? Hoard's Dairym., 1959, 104, (10), 581.
Includes the information that seed drill surveys have shown many samples of oats seeds to be contaminated with quackgrass [Agropyron repens] seed. - L.K. [L.AM.]

71. CABRERA, A.L. and FABRIS, H.A. Una "centaurea" nueva para la Argentina. [A new Centaurea species in Argentina.] Rev.Arg.Agron., 1958, 25, (1-2), 45-6, (Span.)
The botanical characteristics are given of C. diffusa, a new weed found in the Buenos Aires area. - Suppl.Bibl.Turrialba, 9, (1), 25.

72. * COLE, M.J. Variation and interspecific relationships of Chenopodium album L. in Britain. Ph.D.Thesis, Southampton Univ. (n.d.)

73. * de LINT, P.J.A.L. Stem formation in Hyoscyamus niger under short days including supplementary irradiation with near infrared. Meded.Landbouwhogesch.,Gent, 1958, pp.6.

74. DIXIT, S.N. (Banares Hindu Univ., Varanasi,India). Morphological and embryological studies in the family Loranthaceae - IV. Amyema van Tieghi. Phytomorphology, 1958, 8,(3/4),346-64, figs.134,bibl.14. [O.BO.]

75. DOYON, D. (Ser.de l'Information,Min. Agric.,Quebec,Canada). Etude de la distribution geographique de l'Asclepiade commune (Asclepias syriaca L.) en Amerique du Nord. [Study of the geographical distribution in North America of Asclepias syriaca L.] Rep.Quebec Soc.Prot.Plants, 1958, 91-113, (F.), figs.9,bibl.51.
An extract from a thesis presented to the Faculty of Sciences of Montreal University. In it are reviewed the anatomy of A. syriaca; its distribution in N. America and in particular in Quebec province; and the influence on its distribution of climate (particularly temperature and humidity), altitude, soil type, texture, fertility and pH, chalk subsoil, and the activities of man. - D.M.L.S. [215(71)]

76. GRANSTROM, B. Ogräsproblem i Upplandska höstsädesfält. [The weed problem in winter crops in Uppland.] Försök och Undervisning, 1959, 24-34, (Sw.), figs.5,tabs.2, bibl.2.
Gives the results of a survey of the most important weeds in 128 fields of winter sown crops in Uppland carried out in 1956 and 1957. Control by herbicides is mentioned. - L.K. [159(485)]

77. GREAT BRITAIN. Farm weeds. An aid to their recognition. Shell Chem.Co. 2nd ed., 1959, pp.119, 10/6d.
Contains coloured illustrations of 92 weeds, also descriptions and botanical and common names. - D.M.L.S. [O.W.]

78. HARDIN, J.W. (State Coll.,North Carolina, U.S.A.) Calepina irregularis in North Carolina. Castanea, 1958/59 (?), 23, 111.
This weed is reported for the first time to be growing in North Carolina, and it is only the second report in the United States. The report from North Carolina states that it was growing so densely in a lucerne crop that the entire crop was lost. - J.W.B. [43(75.6)]

79. HIRDINA, F. (Tech.Hochschule,München in Weihenstephan,Germany). Beiträge zur Biologie und Bekämpfung des Klettenlabkrautes (Galium aparine L.). [The biology and control of cleavers (Galium aparine L.).] Z.Acker u. PflBau.,1959, 109,(2),173-94, (G.), figs.2, tabs.10,bibl.24.
In laboratory tests 1 year old seed of Galium aparine showed optimum germination (56%) at 2-4°C (the lowest temperature tested) and 2 and 4 year old seed at 15°C 76 and 51% respectively. At 2-4°C 2 and 4 year old seed germinated 5.5 and 0.5% and at 35°C 1, 2 and 4 year old seed, 0, 0 and 1.5%. In field tests no germination occurred > 15°C but this was thought to be due to drying out of the soil. In winter cereals germination took place throughout March and April while in market garden crops it occurred up till the beginning of June. In the dark seeds germinated 50-76%, in the light 0-4% and under intermediate conditions 39-56%; there was very little difference in these tests whether seeds were germinated on filter paper or compost. In experiments on a loam soil Galium aparine germinated best when the moisture was 40-60% of the average water capacity; a decrease in germination was found at 80% capacity. Seeds of G. aparine germinated better at a depth of 4 cm than 10 cm; some germination occurred from 20 cm but none from 30 cm, although the seed was still viable. Galium tricorne germinated at all depths tested 10, 20 and 30 cm - it was greatest at 10 cm. From pH 4.2 to ca. pH 7 germination of G. aparine was 40-60% and growth/plant was similar; > pH 7 germination and growth fell to ca. 10%. In 1 experiment each increase in the amount of nitrogen applied increased growth; G. aparine seems better able to utilise nitrogen than spring barley. Growing G. aparine together with red clover decreased the growth of Galium 9%, with summer vetch 71% and with white mustard 81%; thus crops establishing themselves quickly compete effectively. Seeds of G. aparine and G. tricorne lost their viability after storing for 34 days in manure and after 10 days storage in a Bihu-gas plant. The Trieur Cell-Selector allows complete removal of G. aparine seed from wheat. Control of G. aparine by Kainite and/or calcium cyanamide and DNOC is referred to. - L.K. [O.W.]

80. KIM, E.A. [The biology of rice weeds of the genus Echinochloa.] Uch.Zap.Kzyl-Ordinsk.Gos.Ped.Inst., 1957, (3),161-73, (Russ.).
Data are presented on the biology of 3 species of Echinochloa [including E. crus-galli and E. oryzicola]. It was found that the germination of the various species takes place at the same time as rice (5-6 days after sowing). Once the shoots reach the surface the weeds grow faster than rice. Differences were observed in the position of the leaves and in the tillering of the different species. New branches and tillers are formed throughout the vegetative life of Echinochloa which results in severe infestations. - From Ref.Zh. Biol., 1959, 84025. - L.K.

81. BRAID, K.W. (West Scotl.Agric.Coll., 6, Blythswood Square,Glasgow,Scotland). Bracken: a review of the literature. Mim. Publ.Commonw.Bur.Past.& Field Crops, 1959, 3,pp.69, bibl.466.
The author reviews briefly in 32 pages the distribution, ecology, propagation, morphology, chemical composition and toxicity of Pteridium aquilinum; its control by the following methods: biological, chemical, mechanical, cultural + cropping, management, smother crops and flooding; its utilization; and the cost of destruction. - D.M.L.S. [388(42)]

82. EVDOKIMOV, P.D. [Clinical symptoms and treatment of horses poisoned by Ranunculus sceleratus.] Sborn.Rabot. Leningrad vet.Inst., 1957, 16,20-3, (Russ.) Vet.Bull., 29,(4),1204.

83. CASE, A.A. (Univ.Missouri,Columbia, Miss.,U.S.A.) Some aspects of nitrate intoxication in livestock. J.Amer.vet. med.Ass., 1957, 130,(8),323-9, figs.1, tabs.1,bibl.23.
Nitrate poisoning in livestock is briefly reviewed with reference to symptoms and treatment, detection of potentially dangerous concentrations in plants, and plants liable to be injurious. Diets with a nitrate content $> 0.5\%$ may cause trouble. Nitrate poisoning is particularly liable to occur under conditions of drought and high soil nitrogen. Weeds liable to cause trouble through nitrate poisoning include: Jimson weed [Datura Stramonium], chickweed [Stellaria media], white lambsquarter [Chenopodium album], smartweeds [Polygonum spp.], bull nettle (Solanum carolinense), pigweed [Amaranthus spp.], milk purslane (Euphorbia maculata), barnyard grass [Echinochloa crus-galli], Johnson grass [Sorghum halepense], black nightshade [Solanum nigrum], ground cherry [Physalis sp.], sunflower [Helianthus annuus], and velvet weeds [Abutilon theophrasti?]. Blue-green algae will also cause poisoning. - J.W.B.

84. WILLIAMS, C.N. (Univ.Coll.,Ibadan, Nigeria). Action of inhibitor-β on the growth of Striga seedlings. Nature, Lond., 1959, 184,(4698),1577-8, figs.2,bibl.5.
Inhibitor-β extracted from seeds of Striga lutea has been found to inhibit cell extension of Striga seedlings. Prolonged periods in the inhibitory solution resulted in loss of polarity. The inhibitor is thought to be an aliphatic acid. - L.K. [O.W.]

85. WILLIAMS, C.N. (Bot.Dep.,Univ.Coll., Ibadan,Nigeria). Resistance of sorghum to witchweed. Nature, Lond., 1959, 184, (4697),1511-2, figs.2,bibl.3.
Seedlings of South African-bred Sorghum vulgare of (1) Framida, a variety resistant to Striga lutea, and (2) Light Mori, a susceptible variety, were grown in pots of coarse washed sand for 9 days at 23-31°C temperature. Root solutions were then eluted with 20 ml. distilled water and tested at full strength (as eluted) and at 1:10 and 1:100 for their ability to stimulate germination of the parasite seed. With Light Mori germination was over 50% from the full strength eluent and was not reduced significantly by the 1:10 diluent. With Framida, germination was little more than 30% at the highest concentration and was almost completely inhibited by the 1:10 dilution. To investigate the possibility of the reduced germination by the resistant variety being due to the interaction of an inhibitor with the stimulatory substance, root solution from the susceptible variety (Light Mori) was diluted (1) with water and (2) with Framida root solution. The Framida root solution caused some inhibition of germination but not enough to account for the reduction with Framida in the first experiment which can only be explained by a lower production of the stimulatory substance. The Framida solution was strongly colloidal while that of Light Mori was less so. Inhibition may be due to a proteinaceous compound similar to that from Avena sativa hulls. With other South African sorghums mechanical and physiological obstruction is the cause of resistance. - D.M.L.S. [O.W.]

86. BURTON, G.W., JACKSON, J.E. and KNOX, F.E. (Coll.Agric.,Coastal Plain Exp. Sta.,Univ.Georgia,U.S.A.) The influence of light reduction upon the production, persistence and chemical composition of coastal bermudagrass, Cynodon dactylon. Agron.J., 1959, 51,(9),537-42, figs.6, tabs.5,bibl.5.

Three degrees of shade, approximately 64%, 43% and 29% of normal at mid-day were applied to coastal bermudagrass, fertilised with nitrogen 200 and 1600 #, by covering the plots with 1, 2 and 3 layers of cloth; phosphorous and potassium were maintained at adequate levels. The results below represent the average effect of 1 season of shading.

Total forage yield decreased as shade increased: in full light, low nitrogen resulted in 14,149 # dry matter and high nitrogen in 19,267 #; under heaviest shading the figures were 7,339 # and 5,687 # for low and high nitrogen respectively. With low fertility, yields from plants in full light and those covered with 1 layer of cloth were very similar, indicating that 65% light was sufficient for optimum growth at this nitrogen level. With high fertility, yield reduction due to shade in the first harvest was less than in later harvests, due it was believed, to the ability of the grass to draw on underground reserves for early growth. High nitrogen and 29% light caused a gradual yield reduction, and one season of this treatment caused almost complete kill of the grass. With low nitrogen, yield reduction was much slower and production levelled off considerably above that obtained with high nitrogen. As shade increased, root and rhizome yield decreased: in the 0-6 in. soil zone, full light resulted in 3,768 # dry matter and 29% light in 1,761 #; similarly in the 6-12 in. zone, where the corresponding figures were 929 # and 403 #. Root and rhizome reserve index was significantly reduced from 2.2 in full light, to 1.6,0.8,0.1 (as g green top growth). Low nitrogen - light did not appear to be the limiting factor;high nitrogen - close relationship observed between average annual dry matter yields and available light, suggesting that, at this fertility level, light set the limit for dry matter production.

High nitrogen significantly increased the moisture content of the grass, especially in full light. The most significant change in chemical composition due to shading (from the animal nutrition standpoint) was reduction in available carbohydrates; at low fertility, plants shaded with 3 layers of cloth contained 9.1%, and with full light 15.8%; at high fertility the figures were 6.4 and 8.6% respectively. Neither shade nor nitrogen affected cellulose content; shade significantly increased the lignin content with low nitrogen only. Both nitrogen and shade increased the crude protein content, the increase resulting from shade was significant only at the low nitrogen level. Shade and nitrogen significantly increased phosphorous content although it was consistently higher in the heavily fertilized grass. Calcium and magnesium were slightly decreased with increased fertilization. - J.W.B. [O.RE.]

87. PALMER, R.D. and PORTER, W.K. (State Univ.,Baton Rouge,Louisiana,U.S.A.) The metabolism of nut grass (Cyperus rotundus). I. The influence of various oxygen and carbon dioxide levels upon germination and respiration. Weeds, 1959, 7,(4),481-9, figs.2, tabs.5,bibl.13.

A more detailed report of work described in Weed Abstr., 7,2188. - M.E.L. [O.W.]

88. PALMER, R.D. and PORTER, W.K. (State Univ.,Baton Rouge,Louisiana,U.S.A.) The metabolism of nut grass (Cyperus rotundus). II. The respiratory quotient and its relation to storage materials and some terminal enzymes. Weeds, 1959, 7,(4),490-503, figs.9, tabs.1,bibl.16.

In germinating nut grass tubers R.Q. changed from 2.1 at dormancy to 1 after 5.5 days. Total gas exchange increased with time. Organic acid, fat and total nitrogen contents decreased during first to fourth and increased during fourth to eighth day. Content of citric > malic > oxalic acid and these were unchanged during germination. Soluble carbohydrate content increased during the first 2 and then decreased until the eighth day. Total gas exchange for tissue slices (R.Q. 1.5) > whole tubers.

Measurements on particle suspensions from dormant and germinating tuber homogenates showed the activity of isocitric dehydrogenase decreased and that of succinic dehydrogenase increased with germination. The activities were equal when R.Q. was 1. Oxidation rate of succinate by particle suspension from dormant tubers was twice that of isocitrate or α-ketoglutarate.

Malonate caused 62% inhibition of α-ketoglutarate. In the dormant tuber catechol oxidation was 5.9 ascorbate but after 8 days germination ascorbate oxidation was 3.9 > catechol. Ratio of ascorbate to dehydroascorbate changed from 3.5 at dormancy to 1.5 after 8 days germination. (See Weed Abstr., 8,1262). - M.E.L. [O.W.]

89. PALMER, R.D. and PORTER, W.K. (State Univ.,Baton Rouge,Louisiana,U.S.A.) The metabolism of nut grass (Cyperus rotundus).

III. Polyphenoloxidase in the dormant tuber. Weeds, 1959, 7,(4),504-10, figs.5,bibl.10.
Experiments on tissue slices of 30 microns and homogenates of dormant nut grass tubers showed:- Q O_2 (N) (microlitres O_2 uptake/mg nitrogen) value was 3.2 times greater for the oxidation of L-tyrosine than the oxidation of a control by washed tissue slices at pH 6.3 and 25°C. The most actively oxidised substrate by homogenates was catechol with optimum pH at 6.5 and the oxidations of DL-tyrosine, DL-DOPA and p-cresol were considerably less. Catecholase activity in tissue slices increased with % oxygen.
Percentage inhibition of catecholase from homogenates was:- 72% at pH 4 and 33% pH 6 by 0.02 M oxalic acid; 19% at pH 6.5 by 0.02 M benzoic acid; 47% at pH 6.5 by 0.01 M p-nitrophenol and 41% at pH 6.5 by 0.02 M thiourea. DIECA gave 100% inhibition. - M.E.L. [O.W.]

90. PALMER, R.D. and PORTER, W.K. (State Univ.,Baton Rouge,Louisiana,U.S.A.) The metabolism of nut grass (Cyperus rotundus). IV. The activities of certain enzymes from tubers treated with amitrol. Weeds, 1959, 7,(4),511-7, figs.5,bibl.9.
More detailed description of work reported in Weed Abstr., 8,1388. - M.E.L. [O.W.]

91. KIMMEY, J.W. and MILKE, J.L. (Intermount.For.Range Exp.Sta.,Ogden,Utah,U.S.A.) Western dwarf mistletoe on Ponderosa pine. For.Pest Leaf.1,U.S.Dep.Agric., 1959, 40, pp.7, figs.5,bibl.6.
The life history and method and rate of spread of Arceuthobium campylopodum forma campylopodum (Engelm.) Gill is described, also the symptoms of infection and damage caused to ponderosa pine. Its distribution in N. America is given and distinguished from that of A. vaginatum (Willd.). Its common hosts are Coulter, Digger, Jeffrey, Monterey, knobcone and ponderosa pines. Detailed instructions are given for its control by cutting or pruning infected trees. - D.M.L.S. [O.F.]

92. CUMMING, B.G. (Cent.Exp.Fm,Ottawa, Canada). Extreme sensitivity of germination and photoperiodic reaction in the genus Chenopodium (Tourn.) L. Nature,Lond., 1959, 184,(4692),1044-5, figs.4,tabs.1,bibl.7.
Reports the results of experiments on the effects of variations in temperature, photoperiod and colour of light on germination and floral initiation in C. rubrum, C. salinum, C. glaucum and C. album. - L.K. [O.W.]

93. EDWARDS, M.M. (School Agric.,Univ. Nott.,Sutton Bonington,Loughborough,Leic., England). The germination of charlock seeds. Rep.Nott.Univ.Sch.Agric., 1958, 36-8, bibl.2.
Seeds of Sinapis arvensis ripen in August but almost all are then dormant; maximum germination occurring in the spring. Germination is sporadic, the seed remaining viable in the soil for many years. In a plot experiment including fallow, autumn- and spring-sown cereals, and autumn and spring cultivations, an average of only 3% germinated in the autumn and spring following their production. Higher germination occurred on fallow than on cropped plots, and on spring-sown than on autumn-sown plots. After overwintering for 2 or 3 years the germination capacity rose sharply to >80%, but non-dormant seeds would not germinate if buried at depths > a few in. Main source of weed infestation comes from buried seed brought to the surface by cultivation. Dormancy appears to be caused by the seed coats' high resistance to oxygen; evidence has been accumulated to show that with an internal partial pressure of oxygen below 10-12%, inhibiting substances are produced. When seeds are buried in the soil for 1 or 2 years, the permeability of the coat increases to provide an internal partial pressure of oxygen of 10-12% and this is the minimum requirement for unrestricted growth and the promotion of germination. - J.W.B. [391(42)]

94. FERENCZY, L. Untersuchungen über die Keimungverhältnisse und Stimulation des Hundszahns (Cynodon dactylon (L.) Pers.) unter Berücksichtigung des Berasungs-Frage. [Investigations of conditions for germination and stimulation of Cynodon dactylon (L.) Pers. with reference to sod formation.] Acta biol.Szeged, 1956, 2,(1/4),15-22, (G.).
The optimum conditions for germination were found to be 10 hours at 10° followed by 14 hours at 32°. Illumination was found to stimulate growth. - L.K.

95. JONES, V. An investigation into the effect of light on the germination of Juncus seeds. M.Sc.Thesis,Univ.Coll. N.Wales, 1957, pp.28, figs.19,bibl.17.
Previous literature is reviewed in some detail before introducing an investigation into the effect of light on the germination of Juncus acutiflorus, J. inflexus, J. effusus, J. maritimus and J. acutus. The following observations were made:

they are light-obligate germinators and this need could not be replaced by any other factor (except that a few seeds germinated at 30°C in the dark after their testa had been cut); when a partially germinated seed sample was placed in darkness germination ceased, only to be resumed when the sample was returned to light; seeds were not receptive to light until after the inhibition stage, also inhibition in the dark did not reduce the seeds' viability; rate and % germination increased with light intensity between 50 and 600 foot-candles, and at all these intensities, the introduction of a dark period, either at the beginning or alternating with periods of light, increased germination; the effect of successive light periods were additive even when separated by dark periods of up to 13 days; seeds germinated as soon as ripe and there was no marked effect of ageing in seeds of up to 2 years old; and no evidence was found of a germination inhibitor diffusing out of the seeds.

In conclusion, the author suggests tentative explanations of the mechanism of the light effect. - From Author's Summary. - J.W.B.

96. KLINGMAN, G.D. (Field Crops Dep., State Coll., Raleigh, N. Carolina, U.S.A.) Wild garlic bulblet viability determined by 2,3,5-triphenyltetrazolium chloride. Weeds, 1959, 7,(4),474-80, figs.1, tabs.2, bibl.5.

Percentage germination of Allium vineale bulblets (aerial) 1 month after planting 0.5 in. deep in heat sterilized soil was the same as that predicted by the 2,3,5-triphenyltetrazolium chloride (TZ) colour germination test. Large and small bulblets had the same germination values but plants from the former were 50% taller.

Bulblets with diameter < 0.125 in. were stored in wheat and planted at intervals between September and March. In Petri dish and TZ experiments, 97% of sound bulblets germinated when planted after 7 months' storage. Percent germination of bulblets planted in soil decreased with soil temperature. Excessive heat reduced % germination (probably by inducing dormancy) in the Petri dish test, but did not affect the TZ tests.

Bulblets damaged by cracking or removal of husks germinated when planted immediately after injury and in some cases were viable after 3 months storage. Viability of large bulblets was greater than small bulblets. - M.E.L. [O.W.]

97. SEXSMITH, J.J. (Dep. Agric., Lethbridge, Alberta, Canada). Germination behaviour of samples of wild oats collected in southern Alberta. Proc. 5th Meet. Canad. Soc. Agron., 1959, 91-4, tabs.2, bibl.4.

Nine collections were taken from widely scattered locations. Varietal composition differed considerably, varying from 100% var. vilis to 80% var. pilosissima; all 4 varieties were found in 1 or more of the collections. Dormancy also differed widely, being greatest shortly after collection and decreasing rapidly up to 15-22 weeks after, followed by a levelling off. Alternate wetting and drying of whole seed appeared to cause some degree of secondary dormancy, but when continued for several cycles such secondary dormancy was overcome. Grey-hulled varieties of Avena fatua ssp. fatua were shown to be less dormant than brown-hulled, the dormancy %s for seeds produced under identical conditions being : var. pilosissima 88.4, var. intermedia 81.1, var. glabrata 57.9, and var. vilis 54.5. - Mainly From Author's Summary. - D.M.L.S. [O.W.]

98. HEIN, A. (Inst. Phytopath., Aschersleben, Germany). Beiträge zur Kenntnis der Viruskrankheiten an Unkräutern. V. [A contribution to the knowledge of virus diseases of weeds. V.] Phytopath. Z., 1959, 36,(3),290-301, (G.e.), figs.11, tabs.1, bibl.7.

A virus was isolated from Scrophularia nodosa. 54 Species of 20 families were tested as potential hosts. Weed hosts were: Rumex crispus, Ballota nigra, Datura stramonium, D. metel, Verbascum nigrum and Digitalis purpurea. - L.K. [O.R.]

99. * HUDSON, H.J. The microfungi of Agropyron repens. Ph.D. Thesis, Sheffield Univ., (n.d.)

100. KAUFMANN, M.J., DROLSON, P.N. and NIELSEN, E.L. Artificial innoculation of Bromus inermis with ascospores of Pyrenophora bromi. [Abstract.] Phytopathology, 1959, 49,(9),542.

Epiphytotics of P. bromi were artificially induced under greenhouse conditions (60-75°F) by innoculating mature plants of B. inermis with ascospores from cultures of the fungus grown on PDA and an oat-barley medium. Conidial-mycelial innoculum tested under similar conditions failed to induce satisfactory infection. Innoculated plants were incubated 24 hours in a moist chamber, and lesions characteristic of the disease appeared within 4

days. Lesions that developed differentially on plants of 26 clones of B. inermis within 16 days of innoculation were essentially in agreement with those observed in field nurseries. - L.K. [O.BO.]

101. KEMPER, A. (Pflanzenschutzamt, Münster, Germany). Weitere Unkräuter als Wirtspflanzen des Wurzelgallenälchens (Meloidogyne sp.). [Further weeds as hosts of the root knot nematode (Meloidogyne sp.).] Gesunde Pflanze, 1959, 11,(12),229-31, (G.), figs.1,tabs.1,bibl.2.
Atriplex sp., Matricaria inodora, Galinsoga parviflora, Polygonum convolvulus, P. aviculare, Solanum nigrum, Taraxacum sp. were found to be hosts of Meloidogyne sp. - Plantago major, Sisymbrium sophia, Stellaria media and Grosse Brennessel [Urtica dioica] were not. - L.K. [O.W.]

AQUATIC AND WOODY WEEDS AND THEIR CONTROL

See also 55,63,189,203.

102. NEW ZEALAND. Underwater mower to clear weeds from main drains. N.Z.Fmr, 1959, Sept. 21st, 27, figs.1.
Photograph and brief description of a petrol driven U-shaped reciprocating mower for ditches which is mounted on a flat bottomed boat. - L.K. [53(931)]

103. KRAMER, D. and MANZKE, E. (Inst. Wasserwirt., Luselstrasse 12, Berlin C.2, Germany). Untersuchungen über die herbizide Wirkung von Omnidel Spezial und Omnidel. [Experiments on the herbicidal action of Omnidel Special and Omnidel.] Dtsch.Landw. Berl., 1959, 10,500-4, (G.), figs.3,tabs. 10,bibl.4.
In 2 years' experiments on the control of weeds in irrigation and drainage channels dalapon was about twice as effective as 2,2,3-trichloropropionic acid (1). Dalapon gave very good control of Phragmites communis, good control of Scirpus lacustris, Carex sp., Typha latifolia, Caltha palustris, Iris pseudacorus, Equisetum palustre, Polygonum sp., Cirsium oleraceum, Sonchus palustris, Calystegia sepium and Mentha aquatica, satisfactory control of Glyceria aquatica, Alisma plantago, Nasturtium palustre, Ranunculus acer and Potentilla anserina and was unsatisfactory on Lythrum salicaria. (A table gives also the response of the same species to (1). - L.K. [O.W.]

104. MALONEY, T.E. (R.A.Taft San.Eng. Centre, USPHS, Cincinnati, Ohio, U.S.A.) Control of algae with chlorophenyl dimethyl urea. J.Amer.Wat.Wks Ass., 1958, 50,(3),417-22, figs.1,tabs.1,bibl.6.
In the laboratory 14 concentrations of monuron in an arithmetical series from 0.004 p.p.m. - 32.0 p.p.m. were tested on 33 species of algae for periods of 7 and 28 days and the susceptibility of each species is given in a table. Of the 9 blue-green algae all growth of all species stopped at 2 p.p.m. Six species of diatoms responded similarly. Growth of the majority of both groups was controlled by 0.5 p.p.m. and 1 blue-green (Calothrix) responded to the lowest dose for the 7 day period. Green algae proved more resistant and growth of all species was prevented by 8 p.p.m. although controlled by 0.5 p.p.m. Control of normal growth for 28 days of 1 species (Chlorella) was by 16.0 p.p.m. and 66% of the remaining 16 species was by 2.0 p.p.m. Three field treatments in ponds tend to confirm these findings. The pH of the ponds was from 8-10 and total alkalinity from 125-140 p.p.m. Treatments were all at 1.6 p.p.m., in 2 by spraying the surface and in 1 the bottom mud. Those sprayed on the surface showed that Spirogyra, Hydrodictyon and Mougeotia were effectively controlled, one spray treatment lasted about 5 months. However, Chlorella which was sprayed on the surface was only checked and only for 18 days. The pond which was treated empty and immediately refilled remained free of filamentous algae for 19 days, after 24 days a few clumps of floating Cladophora were present. After 12 weeks 17% of the surface was covered with Cladophora and was retreated; in 4 days the surface was clear and remained so so for 20 days, after which regrowth was rapid. Counts of phytoplankton are also given. No toxicity to fish was evident in the pond trials. - R.J.C. [42(77.1)]

105. JULIN, E. and LUTHER, H. Om blomning och fruktsättning hos Ceratophyllum demersum i Fennoskandien. [The flowering and seed set of Ceratophyllum in Fennoscandia.] Bot.Notiser, 1959, 112,(3),320-38, (Sw.e.), figs.2,bibl.35, tabs.1.
Includes reference to the fact that fructifications of C. demersum have been found in northern Sweden and Finnish Lapland. In > 50% of the years in which

C. demersum was fertile in Stockholm the summer was warmer than usual. The plant flowers freely in brackish water but no fructifications have been observed there. Attempts to grow plants from seed from Northern Sweden were unsuccessful. - From Authors' Summary. - L.K. [O.BO.]

106. GREAT BRITAIN. Water conservation and weed control. World Crops, 1959, 11, (10),375, figs.1.
Lining ditches with black polyethylene can reduce seepage by up to 94% and so speed the flow of water that the cross sectional area of the ditch may be reduced by 33%. The films of 1.5, 4 and 8 mil. thickness have controlled aquatic weeds. Bermuda grass [Cynodon dactylon] and water grass [Echinochloa crus-galli] were virtually eliminated but where nutgrass [Cyperus spp.] is a problem the 2 thicker films are recommended. - L.K. [O.RE.]

107. CHOKDER, A.H. Pond weeds in East Pakistan and their propagation. Agr. Pakistan, 1958, 9,(3),259-309, figs.42, bibl.7.
A key to the identification of 42 aquatic weeds is given together with illustrations and descriptions. - J.W.B. [O.RE.]

108. UNITED STATES. Brush control; a selected list of recent references, compiled by N.G. Larson. U.S.Dep.Agric. Library, 1959, pp.7.

109. FISHER, C.E. and QUINN, L. (Agric. Exp.Sta.,Lubbock,Texas,U.S.A.) Control of three major brush species on grazing lands in the United States, Cuba and Brazil. J.Range Mgmt, 1959, 12,(5),244-8, figs.4, bibl.6.
Discusses the control of Prosopis juliflora in the U.S.A., Dichrostachys nutans in Cuba and Taberae montana fuchsiaefolia in Brazil. Burning, chaining and/or root ploughing is generally necessary for established stands. This should be followed by treatment with 2,4,5-T ± 2,4-D. In the case of D. nutans and P. juliflora this may be either foliage or basal depending on shoot density and the relative cost of herbicides and labour. The land should be sown to grasses and where Prosopis is the problem resprayed about every 5 years; in the case of Dichrostachys annual spraying with 2,4-D + 2,4,5-T may be necessary. T. montana is not controlled by foliage sprays and basal applications of 2,4,5-T are necessary, the land should then be planted with clean cultivated crops for 3-5 years. - L.K. [O.W.]

110. GHANA. Arboricides. Rep.For.Dep. Ghana, 1955/56, 1958, 50-1.
Experiments with various formulations and mixtures of 2,4-D and 2,4,5-T in water and in diesel oil, applied as bark sprays, gave only 17% kill after 22 weeks, compared with 45% after 11 weeks for sodium arsenite (usually increasing to 90%). The latter treatment was also cheaper. Species varied greatly in their susceptibility, smooth barked species such as Ceiba pentandra and Piptadeniadendron africanum being susceptible while Cylicodiscus gabunensis with rough bark showed no reaction even after spraying a girdle where the bark had been scraped smooth. - Mainly from For.Abstr., 20, 4577. - J.W.B. [O.F.]

111. GRATKOWSKI, H. (Pacif.N.W.For.Range Exp.Sta.,Portland,Oregon,U.S.A.) Effects of herbicides on some important brush species in south-western Oregon. Res.Pap. Nthwest For.Range exp.Sta., 1959, 31,pp.33, figs.10,tabs.15.
In trials where chemicals were applied as summer foliage sprays, 2,4-D (low volatile propylene glycol butyl ether ester) 1 lb ahg (a.e./100 gal) water obtained 100% control of Arctostaphylos columbiana and A. canescens and 2 lb ahg 95% and 90% control respectively of A. hispidula and Ceanothus integerrimus. 2,4,5-T (low volatile propylene glycol butyl ether ester) was slightly less effective. C. integerrimus was controlled 95% by amitrol 2 lb ahg and 80% by 2,3,6-TBA 2 lb ahg but only 30% by amitrol 2 + 2,4-D 1 lb ahg. Ceanothus velutinus and C. velutinus var. laevigatus were more resistant to 2,4-D than to 2,4,5-T; the latter at 4 lb agh oil gave 85% and 40% control, 2,4-D 2 lb + amitrol 2 lb ahg 50 and 70% control, and 2,4,5-TP 2 lb ahg 60 and 0% control respectively. The following were resistant to 2,4-D and/or 2,4,5-T up to 4 lb ahg: Castanopsis chrysophylla, C. chrysolphylla var. minor, Lithocarpus densiflorus var. montanus, Amelanchier alnifolia and Quercus chrysolepis; and only very poor control of Arctostaphylospatula and Ceanothus cordulatus was given by 2,4-D and/or 2,4,5-T 2 lb ahg. Amitrol 2-4 lb ahg was ineffectual against C. velutinus, C. velutinus var. laevigatus, C. cordulatus, Castanopsis chrysophylla, C. chrysophylla var. minor and Amelanchier alnifolia, 2,3,6-TBA 1 lb ahg against A. alnifolia, 2,4-D and 2,4,5-T both at 2 lb ahg against

C. chrysophylla, C. chrysophylla var. minor, and 2,4-DP 2 lb ahg was also ineffectual against Ceanothus cordulatus. Details are given of the effects on sprouting and top kill %s. - D.M.L.S. [75(79.5)]

112. PEEVY, F.A. and BURNS, P.Y. (Sth. For.Exp.Sta.,Alexandria,La,U.S.A.) Effectiveness of aerial application of herbicides for hardwood control in Louisiana. Weeds, 1959, 7,(4),463-9, figs.2, tabs.1,bibl.12.

2,4,5-T (butoxyethanol ester) 2 # gave good control of Quercus stellata, Q. marylandica, Q. falcata, Liquidambar styraciflua and Nyssa sylvatica, Carya tomentosa, Q. alba, Q. velutina without serious injury to Pinus palustris, P. taeda, P. echinata. Control of Q. nigra and Rhus capallina was poor. 2,4,5-TP (propylene glycol butyl ether ester) 2 # was slightly less effective for hardwood control except for C. tomentosa, Q. marylandica and Q. nigra. Basal sprouting was negligible on plots treated with these 2 herbicides. 2,4,5-T (amine) 2 #, 2,4,5-TP (amine) 1-3 # and 2,4-DP (amine) 1 # were tested on the same species; they severely damaged, but did not kill, some of the hardwoods. The herbicides were applied on May 30th as aerial sprays in 5 gal water or water (3.5 gal) + diesel oil (1.5 gal) mixture/ac, and the results were assessed as top kill 14 months later. There was no rainfall for over 3 days after spraying. - M.E.L. [O.W.]

113. TANGANYIKA. Rep.Col.Pest.Res.Unit, 1958-59, 24, pp.28.

pp.20-2. The trials reported include the following: (1) in an experiment to determine whether killing by arboricides rather than felling or ringbarking rendered Grevillea robusta less susceptible to Armillaria mellea infection it was found that 6 months after application sodium arsenite (31% w/v paste) and 2,4,5-T (2% ester w/v in diesel oil) had been very effective in defoliating the trees and causing gum to exude through cracks in the bark; (AMS, 2,4-D (ester) and sodium chlorate were less effective); (2) after 3 months, 2,4,5-T in paraffin at 2% w/v had given 95% estimated control of Opuntia spp., a concentration of 1%, diesel oil instead of paraffin, and 2,4-D (ester) were all less effective; on dense stands the arboricide had to be applied at 100 gal/ac to obtain thorough wetting; (3) mecoprop, 2,4-DP, CDAA, polychlorinated benzoic acid isomers, amitrol and 2,4-DES were not satisfactory in established pyrethrum [Chrysanthemum coccineum], relatively low rates of TCA, power kerosene and a high aromatic white spirit showed some degree of selectivity; (4) 2,4-D and amitrol in single and repeated applications with and without subsequent cultivations were tested on Cyperus rotundus; the highest % reduction in stand after 6 months (78%) was given by 2 applications of 2,4-D (amine or ester) at 2 # with 1 month's interval between treatments, amitrol at 4 and 8 # was less effective (conditions during this trial were unusually dry); (5) the following treatments gave only temporary control of Oxalis semiloba - simazine 10 #, monuron and fenuron 20 #, endothal 20 #, 2,4-D, mecoprop, 2,4,5-TP and polychlorinated benzoic acids 8 #, sodium chlorate 400 #, and chlorpropham 20 #; slightly more promise was shown with diuron and amitrol. - J.W.B. [O.W.]

114. MALAYA. Tree poisoning with 2,4,5-T. R.R.I.Plant.Bull., 1959, 45, 148-9.

Brushing 5% 2,4,5-T in diesel fuel on to the bottom 15 in. of the stem has been found to be an infallible method of killing rubber trees (before replanting). - D.M.L.S. [O.RE.]

115. BELGIAN CONGO. [Poison-girdling of unwanted trees with 2,4,5-T.] Rapp. Inst.nat.Etude agron.Congo belge 1957, 1959, 265-6, (F.)

Extensive experiments in connection with operations to open the canopy ('uniformisation par le haut') permit a classification of forest species as: (a) very susceptible (mortality >75%) - Ricinodendron heudelotii, Albizzia sp., Pycnanthus angolensis, Albizzia ferruginea, Pentaclethra macrophylla, P. eetveldiana, Aidia ochroleuca, Pseudospondias gigantea, Dacryodes pubescens, Spondias mombin, Trichilia heudelotii, Discoglypremna caloneura, Piptadenistrum africanum, Newtonia leucocarpa, Ceiba thonningii, Bombax flammeum and Sterculia bequaertii; (b) moderately susceptible (mortality 50%) - Antrocaryon micraster and Pteleopsis hylodendron; (c) resistant (mortality <30%) - Celtis adolfi-frederici, C. mildbraedii, C. zenkeri, Hexalobus crispiflorus, Symphonia globulifera, Hannoa klaineana, Holoptelea grandis, Pterocarpus tinctorius, Klainedoxa gabonensis, Ongokea gore, Alstonia congensis and Monodora myristica. - For. Abstr., 20,4578.

116. TRUMAN, R. (For.Comm.,44 Margaret St.,Sydney,N.S.W.,Australia). Tree

poisoning with 2,4-D and 2,4,5-T. Bull. For.Comm.N.S.W., 1958, 2,pp.28, figs.4, tabs.7,bibl.7.

Part I describes experiments (results tabulated) to determine the reaction of Eucalyptus maculata to several herbicides applied in September, December, March and June. Best kills were obtained with 2,4,5-T (butyl ester) 4 % a.e. in dieseline, or 2,4,5-T (amine) 4% a.e. in water, applied to frills and cut stumps. Results with 2,4-D formulations applied to frilled trees showed wider variation with time of application. The addition of borax to 2,4-D or 2,4,5-T amine salts did not significantly increase their toxicity. Arsenic compounds (arsenic pentoxide and sodium arsenite), AMS (40% in water), and AMS crystals all gave inferior results. 2,4,5-T (butyl ester) 4% a.e. in dieseline gave the best results for basal bark applications, but this method was only considered to be satisfactory when treating trees up to 2 in. in diameter at breast height.

Part II makes recommendations for the control of woody species using 2,4-D and 2,4,5-T formulations, including methods of application and a list of registered herbicides which can be obtained in N.S.W. - J.W.B. [O.F.]

117. TSCHIRLEY, F.H. and HULL, H.M. (Crops Res.Div.,A.R.S.,U.S.Dep.Agric., Tucson,Arizona,U.S.A.) Susceptibility of velvet mesquite to an amine and an ester of 2,4,5-T co-related to various biological and meteorlogical factors. Weeds, 1959, 7, (4), 427-435, figs.4,tabs.1,bibl.21.

No quantitative correlation was observed between air temperature and soil temperature at 25 cm depth, relative humidity, leaf moisture, or nature and content of carbohydrates in the root xylem at time of treatment, and the period of maximum susceptibility of Prosopis juliflora velutina to foliar applications of 2,4,5-T as the triethylamine salt or the propyleneglycolbutylether ester. Defoliation measurements after 12 separate applications of the herbicides between April 29th and July 1st at 4 lb a.e./100 gal in 1:4 oil/water emulsion showed the ester to be consistently more effective than the amine salt and to have a longer period of maximum effectiveness. Optimum growth stage for application of the ester occurred when leaves were fully grown but succulent, flowering complete and pod length < 1 in. Mesquite sensitivity to the amine salt decreased after thickening of the leaf cuticle. - M.E.L. [O.W.]

118. NEW ZEALAND. Farm inquiry service. Service, 1959, 4,(1),23.

Includes the information that native honeysuckle (Rewa rewa) [Knightia excelsa] has appeared more susceptible to 2,4,5-T than to 2,4-D and recommends overall application of an oil-based 2,4,5-T formulation in water at a concentration of 1:200. - D.M.L.S. [O.W.]

119. UNITED STATES. New Allied herbicide. Agric.Chemic., 1959, 14,(10),93.

The Allied Chemical Corp., New York has developed a new weed and brush killer - "Urab" (3-phenyl-1,1-dimethylurea trichloroacetate) which is soluble in water and is designed for deep rooted weeds. It is said to be effective against scrub oak [Quercus spp.], wild hickory [Carya sp.], sassafras [S. albidum], poison sumac [Rhus radicans], trumpet vine [Campsis radicans], briars [? Rosa sp.], cattails [Typha spp.] and Canada thistle [Cirsium arvense]. - D.M.L.S. [O.W.]

120. * CHROSCIEWICZ, Z. Controlled burning experiments on jack pine (Pinus banksiana) sites. Tech.Note Canadian Dep.Nth. Aff. & Nat.Resources For.Res.Div., 1959, 72, pp.19.

121. LEONARD, O.A. and CARLSON, C.E. (Univ.Calif.,Davis,Calif.,U.S.A.) Aircraft spraying of blue oak. Calif.Agric., 1959, 13,(12),3.

When 2,4-D, 2,4-DP, 2,4,5-T and 2,4,5-TP were applied at 2 #, in May or June for 1 year only and for 2 and 3 years in succession the best control of both Quercus douglas i and Q. diversiloba was obtained by 2,4,5-TP (propylene glycol butyl ether ester) applied for 2 or 3 years. The amine was much less effective. In general, May applications were better than June and the best time to spray appeared to be as soon as possible after leaf maturity. Phenoxypropionics were superior to phenoxyacetics, and for general brush control 2,4,5-TP was superior to 2,4-DP though the latter appeared equally effective against P. douglasii. - D.M.L.S. [O.W.]

Not d

121a. BURGOYNE, D.L. (Du Pont Co., San Francisco,Calif.,U.S.A.) Brush control in range land and forage crop improvement. Stockman's Handb.Wash.State Coll.Dep.Anim. Sci., 1958, 186-9, bibl.3.

[166(79.4)]

See also 1,2,3,5,6,11,12,16,18,21,22,34,35,45,48, 49,50,53,54,57,60,64,65,66,113,119,189,193,200, 203,207.

122. DUDLEY, E.A. (428 Cabrillo Terrace, Corona del Mar,Calif.,U.S.A.) Urban weed control. Proc.Calif.Weed Conf., 1959, 11, 16-22.
Included in this paper are 2 charts listing the effects of the following herbicides on 25 weeds of uncultivated ground:- Karmex [diuron] 4, 8 and 12 #, Baron [erbon] 8 and 16 quarts/ac, trichlorobenzoic acid 2.67 and 3 gal/ac, polychlorobenzoic acid 2.67 gal/ac, Alanap 3 [NPA (sodium)] 8 quarts/ac, simazine 2.25 and 3 #, and Weedazol [amitrol] 3 and 6 #. - J.W.B. [O.W.]

123. BIRYUKOVA, V. and RYBAKOVA, M. [Chemical weed control ....] Nauka Peredov. Opyt Selsk., 1958,(12),54-5, (Russ.).
For the control of fumitory [Fumaria officinalis], Chrysanthemum sp., chickweed [Stellaria media] and certain other resistant weeds in winter cereals it is recommended that 2,4-D 0.7-0.8 kg/ha be applied either in the autumn or in both the autumn and spring. - From Ref.Zh.Biol., 1958, 79575. - L.K.

124. GOSS, R. Summary of uses of neburon (Kloben) 50% formulation, for turf purposes in the Northwest. Southern Calif.Turfgrass Cult., 1959, 9,(3),22-3.
Includes the following suggested uses for neburon: Stellaria media, Cerastium vulgatum and Sagina procumbens, apply 2 # a.i. on warm days (85°F or lower) during season of rapid growth (May-August); Black algae - complete control has been achieved by December after applying 0.5 # in November. - J.W.B. [169(79.4)]

125. * del POZO, G. Campana en San Carlos contra la galega (Galega officinalis). [Campaign in San Carlos against Galega officinalis.] Plan Chillan, 1958, 4,(11), 9-11.

126. VERMA, R.D. and BHARDWAJ, R.B.L. (Ind. Agric.Res.Inst.,New Delhi,India). Control of Pohli (Carthamus oxyacantha Bieb.) by 2,4-D. Ind.J.Agron., 1959, 4,(1),43-7, tabs.2,bibl.6.
Post-em. 2,4-D (sodium) 1 # a.e. in 60 gal water sprayed 6 weeks after wheat had been sown, gave 100% control of Pohli in 10 out of 11 trials and in the remaining case 91.8%; wheat yields were increased over the control from 5.4 to 36.8%. 1.5 # a.e. in 60 gal water applied about 20 days after harvest when the Pohli were flowering markedly decreased the number of seeds/plant, the mean weight of seeds and viability. Handweeding would cost about Rs.20.00/ac, compared with Rs.7.82 and Rs. 9.73 for post-em. and post-harvest chemical control respectively. - J.W.B. [O.RE.]

127. BESS, H.A. and HARAMOTO, F.H. (Univ. Coll.Agric.,Agric.Exp.Sta.,Honolulu, Hawaii). Biological control of Pamakani, Eupatorium adenophorum in Hawaii by a tephritid gall fly, Procecidochares utilis. 2. Population studies of the weed, the fly and the parasites of the fly. Ecology, 1959, 40,(2),244-9, figs.6,bibl.11.
Data obtained in different localities and seasons, especially on the island of Mani, are presented. - D.M.L.S. [O.R.]

128. DANA, M.N. (Univ.,Madison,Wisconsin, U.S.A.) Amino triazole for cranberry weed control in Wisconsin. Cranberry, 1959, 24,(1),7-8.
Includes the information that the following weeds are susceptible to amitrol: alsike clover [Trifolium hybridum] 8-10 #, golden rod [Solidago sp.] 6 #, ragweed [Ambrosia sp.] 4 #, arrowhead [Sagittaria sp.] 6 #, and lady's thumb smartweed [Polygonum persicaria] 4 #. Some weeds which have shown considerable tolerance to amitrol at rates up to 6 # are: St. Johnswort [Hypericum sp.], royal fern [Osmunda regalis], anemone [Anemone sp.], rattlesnake grass [Glyceria canadensis], and round rush [Juncus sp.]. - J.W.B. [70(77.5)]

129. CONWAY, E. (Dep.Bot.,Univ.Glasgow, Scotland). The bracken problem. Outlook on Agric., 1959, 2,(4),158-67, figs.13, tabs.3,bibl.18.
The plant form and growth and method of reproduction is fully described and illustrated and the effects of mechanical control methods briefly reviewed. In trials in 1957 sodium chlorate 170 # and borate (granulated) 300 # both applied before bracken emergence killed all rhizomes in the top 3-4 in. but not the deeper rhizomes; AMS 75 # applied before emergence and 15 # as a foliar spray, sodium chlorate 20 # as a foliar spray and para-chlorobenzoic acid 10 # applied before emergence were of little or no use. The effects of amitrol and dalapon, both at 20 and 40 #, on rhizome tips and associated frond buds 8 weeks and 1 year after treatment and on frond density in the year after

treatment are tabulated. The results showed marked reduction in frond density for both compounds but very little effect on the rhizomes and it is concluded that neither is capable of eradication. Gibberellic acid tested on first year plants produced general growth stimulation. The action of phenoxy compounds is discussed briefly. - D.M.L.S. [O.W.]

130. CONWAY, E. and FORREST, J.A. (Univ. Glasgow, Scotland). Effects of substituted phenoxy-compounds and other translocated herbicides on the rhizome of bracken. Nature, Lond., 1959, 184,(4696),1416-8, tabs.1,bibl.11.
4-CPA 4, 7.5 and 10 # was applied to Pteridium aquilinum before and at frond maturity. All treatments had a much greater effect than cutting at the early date. The highest rate was most effective and the later date was considerably more effective than the earlier. No treatment completely killed all rhizome tips and frond buds but the highest rate gave nearly complete kill. - L.K.
[O.W.]

131. CORDS, H.P. and MADSEN, R.A. (Agric. Exp.Sta.,Nevada,U.S.A.) 2,4-D gives low-cost control of wild iris. Crops & Soils, 1959, 12,(3),25.
2,4-D 4 # applied 3 to 4 weeks after flowering gave 98% kill of wild iris [Iris versicolor]. Dalapon gave excellent kill, but killed most of the grasses too, allowing invasion by other weeds; in addition it was more expensive than 2,4-D. Other chemicals tested, but found to be less effective than 2,4-D, were amitrol, 2,4,5-T, 2,4,5-TP and monuron. - J.W.B. [O.W.]

132. GREATHEAD, A.S. (Univ.,Davis, Calif.,U.S.A.) Strawberry weed control. Proc.Calif.Weed Conf., 1959, 11,30-1.
Includes the information that 2,4-DEB has killed shepherds purse [Capsella bursa-pastoris] even after it was 1 in. high. - J.W.B. [O.W.]

133. GREAT BRITAIN. Rep.agric.hort. Res.Sta.Bristol, 1958, pp.188.
p.27. Sensitivity of Coleus plants to 2,4,5-T was found to be favoured by low light intensity and short days, approximately 4 times as much 2,4,5-T being required to produce the same response on Coleus plants grown under long day/high light conditions as on short day/low light plants.

Regeneration of Convolvulus arvensis from heavily infested plots sprayed in 1957 with 2,4,5-TB 500-1500 p.p.m. was negligible. Simazine 5 # failed to control couch grass [Agropyron repens] but dalapon 5 # and particularly at 10 # effectively checked it without injuring cordon apple trees.
p.43. Willows. On plots which received inter-row ground sprays of 2,4-D 3700 p.p.m. and 2,4,5-TB 3900 p.p.m. in 1957 the ground cover in 1958 consisted entirely of greater bindweed [Calystegia sylvestris]. 2,4-D gave better control than 2,4,5-TB, the relative surface coverage on June 4th being 15% for 2,4-D and 30% for 2,4,5-TB against 50% for the control, and on July 17th 60%, 100% and 100% respectively. On plots which had received foliar sprays of 2,4,5-TB, bindweed was completely controlled by 1000 and 1500 p.p.m. but not by 500 p.p.m. No willow stools were killed by these treatments but the vigour of 1958 growth was reduced. (Other abstracted parts of this report are inserted under the authors' names). - D.M.L.S.
[O.RE.]

134. KERSTING, F. (LandwirtschaftsKammer, Westfalen-Lippe,Germany). Versuche zur Huflattichbekämpfung mit Aminotriazol. [Experiments on the control of coltsfoot with amitrol.] Gesunde Pflanze, 1959, 11, (11),211-9, (G.), figs.3,tabs.3,bibl.5.
In 32 experiments in 1958, Tussilago farfara on fallow land and in cereal stubble was sprayed with amitrol 5-10 kg/ha between June and early October. In several experiments > 90% control was achieved. Where results were unsatisfactory (mainly in the stubble treatments) it was found that the weed had lost much of its leaf through fungus infection or during harvest. There appeared to be no difference between the times of treatment. Adding a wetter or varying the time of ploughing after top kill was also found to have no effect, and cultivation before treatment resulted in poorer control. Amitrol gave better results than 2,4-D + 2,4,5-T (esters). It is recommended that 5-7.5 kg/ha a.i. amitrol should be applied in at least 600 l of water where the expense is warranted. The setting of viable seed may be prevented by spraying with 2,4-D or MCPA 0.3-0.5 kg/ha. - L.K.
[O.W.]

135. BONDARENKO, D.D. (State Univ.,Ohio, U.S.A.) Kill Canada thistle. Agric.Ext. Leafl.Ohio State Univ., 1959, L-80,pp.8, figs.3.
The characteristics of Canada thistle [Cirsium arvense] are mentioned. This is followed by a discussion of control methods

including cultural, and the use of amitrol, 2,4-D and sodium chlorate. - J.W.B. [43(77.1)]

136. PARSONS, W.T. (Dep.Crown Lands & Survey,Melbourne,Australia). Artichoke thistle. J.Dep.Agric.Vict., 1959, 57,(9), 579-84, figs.8.

Cynara cardunculus, a proclaimed noxious weed, is described and illustrated, and its life history, distribution in Victoria, and ecology are discussed. MCPA (sodium), 2,4-D (sodium) and MCPA (amine) have given the most effective control, in that order, and are superior to 2,4-D (amine and ester) and 2,4,5-T. They should be applied for 2 seasons as a 0.2% solution in the full leaf stage just prior to the formation of the flowering stem; or to obtain more rapid but less durable control a 0.4% solution may be applied in 1 season. The treatments should be followed by pasture improvement and top dressing. Boom spraying is not advised. Grubbing is also effective if the bulk of the root system is removed. Arsenicals, particularly arsenic pentoxide,have given good control if applied near the flowering stage; non-poisonous chlorate weed killers were less effective. Where land is cultivable, the weed may be cleared by cultivating for 2 years followed by pasture sowing. - D.M.L.S. [O.W.]

137. * CORNMAN, J.F. Chemical control of crabgrass; 1959 Cornell recommendations. Bull.N.Y.State Turf Ass., 1959, 63,246.

138. PERRY, T. Long leys and spring work beat wild oat. Farm Weekly, 1959, 51,(11),53.

At Boxworth Experimental Husbandry Farm the number of wild oats [Avena spp.] found per ac after 3 years in ley was 38000, after 4 years 11000, after 5 years 8000 and after 6 years 270. Nine years in ley resulted in complete eradication. Early sowing of barley resulted in an increase in wild oat population in 1 year from 2728 per ac to 7888 per ac. Delayed sowing of wheat to permit cultivations resulted in a decrease in wild oats in 1 year from 1304 to 298. - L.K. [O.W.]

139. UNITED STATES. Carbyne - new post-emergence herbicide announced by Spencer Chemical Co. Agric.Chemic., 1959, 14, (11),53,119.

Carbyne (4-chloro-2-butynyl N-(3-chlorophenyl)carbamate) has an acute oral LD 50 of 1.3 g/kg to rats. No ill effects were caused by inhalation, eye and skin irritation tests on rats, mice, rabbits and guinea pigs. "Chronic tests on rats and dogs for 9 months have raised no questions". During the past few years certain intermediates and the active ingredient itself have caused isolated cases of dermatitis.

As a result of greenhouse tests by Spencer Chemical Co. they report that Carbyne is a safe herbicide for use on wheat, barley, flax, sugar beets and peas and they intend to make the following recommendations (in each case application should be made when wild oats [Avena fatua] are in 1.5-2.25 leaf stage): on wheat and barley 0.5 # at the 1.5-2.5 leaf stage, or 6-9 days after weed emergence growing under normal conditions; on flax 0.5 # at the 8-10 leaf stage, or 6-9 days after emergence; on sugar beet and peas, 1.0-1.5 # 6-9 days after emergence of the wild oats. - J.W.B. [O.W.]

140. GOODIN, J.R. (Univ.Calif.,Los Angeles,Calif.,U.S.A.) Chemical control of flowering of Pennisetum clandestinum, Kikuyugrass. Southern Calif.Turfgrass Cult., 1959, 9,(3),17-8, tabs.1,bibl.1.

In an experiment designed to control flowering of Kikuyugrass, the following chemicals caused a significant reduction in the number of flowers/plant:- MH-40 at 500,1000 and 2000 p.p.m. concentration; 1-naphthaleneacetic acid (NAA) at 20, 200 2000 p.p.m.; tris(2,4-dichlorophenoxyethyl) phosphite (1) at 5000,10000 and 20000 p.p.m. and 2,4,5-T at 250 and 2500 p.p.m. Of those NAA 2000 p.p.m., MH-40 1000 and 2000 p.p.m., 2,4,5-T 2500 p.p.m., and (1) 20000 p.p.m. were the most effective, the latter 2 causing death within 3 weeks. - J.W.B. [168(79.4)]

141. HAY, J.R. and OUELLETTE, G.J. (Cent. Exp.Farm,Ottawa,Ont.,Canada). The role of fertilizer and 2,4-D in the control of pasture weeds. Canad.J.Plant Sci., 1959, 39, (3),278-83, tabs.6,bibl.8.

2,4-D 1 # applied in June and September for 3 years did not affect Ranunculus acris in experimental plots of Kentucky bluegrass (Poa pratensis) and wild white clover (Trifolium repens); Cirsium arvense was reduced and Hieracium florentium, Chrysanthemum leucanthemum, Daucus carota, Cichorium intybus and Taraxacum officinale were eliminated. Quality but not yields of forage were improved although injury to

clover occurred. Liming at 2-6 tons/ac markedly decreased the stand of H. aurantiacum, H. pilosella, C. leucanthemum, Lycopus uniflorus and Fragaria virginiana but not of T. officinale, Equisetum litorale or Achillea millefolium. Fertiliser alone (NPK) markedly reduced H. florentium, C. leucanthemum, Daucus carota, C. intybus, H.pilosella and L. uniflorus but none of the other species. Optimum yields together with absence of weeds resulted from applications of fertiliser supplemented by 2,4-D. - M.E.L. [O.RE.]

142. PERRY, T. Sprays put new life into washland. Fmrs' Weekly, 1959, 51,(12),63, figs.3.
Spraying with dalapon 6 or 12 # in October when the land was ankle deep in water appeared to eradicate tussock grass [Deschampsia caespitosa] and allowed the native grasses to grow away. - L.K. [O.W.]

143. TANGANYIKA. Progr.Rep.Col.Pest. Res., 1959, 25,pp.16.
p.10. Cyperus rotundus - amitrol 4 and 8 # gave good control and was better than 2,4-D and MCPA; EPTC and trichlorophenylacetic acid were relatively ineffective.
p.11. 2,4-D pre-em. at 2 or 4 # gave effective control of Trichodesma zeylanicum in maize; simazine did not control the weed.
In a small scale trial Lippia sp. in grassland was reasonably well controlled with 2,4-D (ester) 5 #.
Fenac [2,3,6-trichlorophenylacetic acid] + chlorpropham each at 10 #, gave good control of Oxalis sp. Amitrol 10 # + 2,4-D (ester) 5 # also showed promise. - J.W.B. [O.W.]

144. GRODZINSKAYA, V.F. [The weediness of the soil of black and covered fallows.] Nauch.Zap.Belotserkovsk.Selsk.Inst., 1958, 5,237-47, (Russ.)
The experiments were carried out on a 9-field rotation at the Belotserkovsk Agricultural Experiment Station. An oat vetch fallow reduced the weed seed content of the soil to 61%, and pea fallow to 47%. A maize fallow was nearly as effective as a black fallow. A potato fallow using an early maturing variety was better than a black fallow or an equivalent pea fallow. From Ref.Zh.Biol., 1958, 79580. - L.K.

145. HARTLEY, G.S. (Chesterford Park Res.Sta.,Essex,England). Progress in railway weed control. Rly Gaz., 1959, pp.4, figs.9.
The author discusses briefly the use of herbicides on railways, the main characteristics of chemicals used (including 2,4-D and MCPA + TCA (sodium) or + dalapon, simazine and monuron), and a prototype sprayer capable of operating at 20 m.p.h. - J.W.B. [389(42)]

146. HARMOND, J.E. (Agric.Engng Res.Div., A.R.S.,U.S.Dep.Agric.,Corvallis,Oregon,U.S.A.) Hard-to-handle seeds. Crops & Soils, 1959, 12,(3),7-8,18, figs.1.
Methods of separating grass seeds from waste are discussed, including use of hammer mills, indent cylinders, and inclined canvas belts, debearding machines, and a blow torch for burning awns. The use of binders, and materials such as rice hulls, to facilitate feeding difficult seed through the planters is also mentioned. - J.W.B. [O.W.]

147. KOTT, S.A., VASILEV, D.S. and TARASENKO, B.I. [Stubble burning.] Selsk. Kuban.Inf.Bull., 1958, (3),27-31, (Russ.)
Recommends stubble burning as a means of controlling weeds, pests and diseases. The data adduced are from experiments carried out on spring wheat at the North Kazak Experiment Station. - Ref.Zh.Biol., 1959, 84013.

Noted.

147a. DREGER, R. (State Coll.,Washington, U.S.A.) The beetle that saved the range. Crops & Soils, 1959, 12,(3),12-13, figs.5.
Hypericum perforatum beetle. - J.W.B. [O.W.]

147b. GALENSA, F. Zur Frage der Duwock bekämpfung. [On the control of horsetail.] Praxis u. Forsch., 1959, 11,(8),203-6, (G.), tabs.8.
MCPA and fertilisers on Equisetum arvense and E. palustre. - L.K. [201(43)]

CHEMISTRY, PHYSICS, TOXICOLOGY, RESIDUES AND SOILS

See also 16,18,19,34,139,179,190,203,204.

148. TAKEDA, A. (Ohara Inst.Agric.Biol., Okayama Univ.,Kurasiki,Japan). m-Nitro- and m-trifluoromethyl-aryl acids as plant growth

regulators. Contr.Boyce Thompson Inst., 1959, 20,191-6, tabs.2,bibl.20.

Solutions of m-substituted aryl acids applied to the foliage of tomato (Lycopersicon esculentum) plants at the 4-leaf stage showed the following relative activities:- m-nitrophenylacetic acid > m-(trifluoromethyl)phenoxyacetic acid = N-(3,4-dichlorophenyl) glycine and its amide > N-(m-nitrophenyl)glycine = N-[(m-trifluoromethyl)phenyl] glycine = m-nitrophenoxyacetic acid > N-(m-nitrophenyl) glycinamide > N-(3-trifluoromethyl-4-chlorophenyl) glycine and its amide.

Compounds which were active only when applied in solution to the soil were m-nitrophenoxyacetamide > N-(m-nitrophenyl)-N-methylglycinamide = α-(m-nitrophenoxy) propionic acid. Inactive compounds were N-(3-trifluoromethyl-4-chlorophenyl) glycinonitrile, 3,5-dinitrophenoxyacetic acid and m-carboxyphenoxyacetic acid.

M.p.'s and syntheses of the 16 compounds are given. - M.E.L. [O.W.]

149. TAKEDA, A. (Ohara Inst.Agric.Biol., Okayama Univ.,Kurasiki,Japan). α-Substituted aryl-acetic acids as plant growth regulators. Contr.Boyce Thompson Inst., 1959, 20,197-208, tabs.2,bibl.20.

Solutions of phenylglycollic acids and their o-methyl derivatives were tested as foliage sprays for cell elongation and leaf modification activities on tomato (Lycopersicon esculentum) plants at the 4-leaf stage. In the α-methoxy substituted phenylacetic acids the relative activities were 3,4-dichloro- > 2,4-dichloro- (1) > 4-chloro- = 3-chloro- ; the 2-chloro-compound was inactive. α-Methoxy-(1-naphthyl)acetic and α-(2-chlorophenyl)-, α-(2,4-dichlorophenyl)- (2) and α-(3,4-dichlorophenyl) glycollic acids showed low activity. Inactive compounds were α-(1-naphthyl)-, α-(3-chlorophenyl)-, α-(4-chlorophenyl) glycollic acids and α-(3-nitrophenyl) glycollic acid (3) and its o-methyl derivative; also, α-sulphophenylacetic acid (barium salt) and 5-(2,4-dichloro-α-carboxybenzyl)- (4) and 5-(α-carboxybenzyl)-N,N-dithiocarbamate). Results for α-2,4-trichlorophenylacetic ethyl ester were indefinite. The synthesis of (1,2,3 and 4) are briefly described (melting points are given). - M.E.L. [O.W.]

150. SOYEZ, J.L. Herbicides a base de derives substitues de l'uree. [Herbicides based on substituted derivatives of urea.] Chim. & Industr., 1959, 81,(2),220-6, (F.e.)

The preparation, properties and uses of substituted phenylurea herbicides, including monuron and fenuron, are described. - J.Sci.Fd Agric., 10,(9),ii-123.

151. PHILLIPS, M.A. (Dr. M.A. Phillips & Associates,Romford,Essex,England). A novel safety pack for toxic materials. Pest Technol., 1959, 1,(12),268-9).

Water-soluble polyvinyl alcohol sheets from 0.04 to 1.00 mm thick have substantial tensile strength, and when dry, can be handled easily without tearing. These sheets can be heat-sealed to form packs for toxic materials (either solid or liquid provided the latter do not contain any substantial amount of water). When used in spray-tanks with a power operated mechanical agitator the packs dissolve in a few minutes; in tanks with re-circulation pumps they may take 15-20 minutes to dissolve completely. In the author's opinion, it is not necessary for the operator to wear protective clothing or rubber gloves during the dilution operation, but the use of goggles is advised in some cases. - J.W.B. [O.W.]

152. HADDOCK, L.A., HILL, R. and JONES, A.G. (I.C.I.Ltd,General Chem.Div., Widnes,Lancs.,England). Seven methods of determining the active constituent of MCPA weedkillers. Mfg Chem., 1959, 30, (2),57-60, figs.4,bibl.8.

Methods for the determination of MCPA in the water insoluble acidic fraction of technical formulations of MCPA are discussed.

The differential refractometric method was the most reliable after corrections were made for 2-methylphenoxyacetic acid when present in concentrations >3%.

Errors in ultra-violet and infra-red analyses, and gas chromatography of the methyl esters were caused by the presence of unidentified impurities and in the case of ultra-violet analysis, 2-methyl- and 4,6-dichloro-2-methyl phenoxyacetic acids interfered with the results.

Liquid-liquid chromatography gave results independent of impurities present but reproducibility was poor and difficulty occurred in packing efficient columns for separation of 4,6-dichloro-, 4-chloro- and 6-chloro-2-methyl phenoxyacetic acids.

The isotope dilution method was not considered sufficiently accurate. The cryoscopic method was accurate to ± 1% after preliminary purification of the acidic extract, but 2-methylphenoxyacetic acid interfered with results.

It was concluded that at least 2 methods should be used for activity determination of commercial MCPA. - M.E.L. [O.R.]

153. ECKSTEIN, Z. and SOBOTKA, W. [On the preparation of weed-killing agents. XI.] Przem.chem., 1958, 37,(8),537-9, (Polish).
It was found that γ-(2-methylphenoxy)-butyric acid and γ-phenoxybutyric acid can be chlorinated with chlorine in statu nascendi. By this method MCPB and 2,4-DB were prepared. Their structure was proved by other synthetic methods. Results of preliminary pot and field trials with MCPB and 2,4-DB in flax were satisfactory. - From Pol.Tech.Abstracts, 2,(34),5960.

154. DANIELSON, L.L. (A.R.S.,U.S.Dep. Agric.,Beltsville,Maryland,U.S.A.) Mode and rate of release of isopropyl N-(3-chlorophenyl) carbamate from several granular carriers. Weeds, 1959, 7,(4),418-25, figs.4,tabs.1,bibl.10.
Measurements of hypocotyl elongation of cucumber seedlings exposed for 96 hours at 28°C to CIPC at 0.5-5000 micrograms to each 100 x 15 mm Petri dish containing 10 seeds showed the contact activity of crystalline CIPC > CIPC on calcined attapulgite > uncalcined attapulgite > pyrophyllite > perlite > vermiculite > activated charcoal. Moistening with water increased the vapour activities of granular formulations which disintegrate on contact with water (calcined and uncalcined attapulgite), did not affect porous granules (perlite, vermiculite and charcoal) and reduced the activity of impervious formulations (pyrophyllite). In all cases major contact and vapour responses occurred at 0.5-50 micrograms. The formulations were prepared by impregnating the granules with a solution of CIPC in acetone. - M.E.L. [O.W.]

155. LINDSTROM, Y. (Svenska Lantmännens Riksforbund,Stockholm,Sweden). De kemiska bekämpningsmedlens sidovorkningar. [The side effects of pesticides.] K.Lantbr.Akad. Handl.,Stockh., 1959, 98,(4),267-79, (Sw. e.), tabs.5.
The provisional figures for 1955-8 show there were 4 cases of injury to man from the use of weedkillers and desiccants (none fatal) but 65 cases of injury to domestic animals including 201 deaths (170 by arsenicals, 27 by sodium chlorate and 4 by dinitros). There was 1 case of injury to bees by growth regulator herbicides and 17 cases of injury to wild animals (16 from arsenicals and 1 from monochloroacetate). 25 cases of drift injury to plants were reported. - L.K. [O.W.]

156. DAVIS, J.T. and HARDCASTLE, W.S. (Wildlife & Fish.Comm.,Monroe,Louisiana,U.S.A.) Biological assay of herbicides for fish toxicity. Weeds, 1959, 7,(4),397-403, figs.1, tabs.2,bibl.17.
Laboratory experiments on bluegill sunfish (Lepomis macrochirus) fingerlings in (a) water contaminated with commercial effluent, (b) relatively pure water gave the following TLm (median tolerance limit [LD 50]) values in p.p.m. after 24 hours: 2,4-D (a) 350, (b) 390; CIPC (a) 10, (b) 20; MCPB (a) 15, (b) 20; 2,4-DB (dimethylamine) (a) 10, (b) 20; 1,2-dibromoethane (a) 18, (b) 25; 1,2-dibromo-3-chloropropane (a) 50, (b) 125, reduced to 20 after 48 hours; 2,3,6-TBA (a) 1750, (b) 1800 and 2,3,5-TBA (a) 150, (b) 175 and 90 after 48 hours.
Hexachlorocyclopentadiene caused loss of equilibrium but no deaths after 24 hours. Their values were 30 after 48 hours and 25 after 96 hours in water (b). Largemouth bass (Micropterus salmoides) treated with the same chemicals gave slightly lower TLm values. - M.E.L. [O.W.]

157. BANDT, H.J. (Inst.Fischerei,Berlin-Friedrichshagen,Germany). Uber die Giftwirkung von Herbiziden auf Fische. [The toxic action of herbicides on fish.] Z.Fisch., 1957, 6,(1/7),121-5, (G.), tabs.2,bibl.7.
Consists, mainly, of a table giving the toxicity of several herbicides to perch and roach. The following are: (1) of low toxicity - TCA, chlorate, dalapon, 2,2,3-trichloropropionic acid, (2) of little danger owing to the rates used - MCPA, 2,4,5-T, 2,4-D, simazine, amitrol + TCA + 2,4-D, and monuron, (3) liable to be injurious and are not recommended - 2,4,5-T + 2,4-D, diesel oil, chlorpropham + monuron. Certain formulations of TCA which caused a greater increase in alkalinity were about 5 times as toxic as others. - L.K. [203(43)]

158. NETHERLANDS. CIPC (Chlorphenylisopropylcarbamate) as herbicide. Pest.Rep., 1959, 39,pp.22, tabs.30,bibl.6.
Detailed reports are given of trials for the determination of CIPC residues in several vegetable crops, using granular and oil emulsion formulations at varying dosages and times of application on different soils, and applied to various varieties. The following table gives the maximum residues found (when the

plot averages in the various trials are compared:-

	No. of trials (at various dosages)	Dose in kg/ha	Formulation	Time of Application No. of weeks before harvest	Method (o.c. = over the crop)	Residue in .p.p.m.
Onions	11	2-4	oil	9-13	o.c.	<0.03
Onions	11	2 x 4.3	oil	4 & 2	o.c.	0.09
Shallots	10	2 x 4.8	oil	7 & 10	o.c.	0.09
Leeks	3	3.2	oil	13	o.c.	<0.02
Carrots	3	2	oil	7 (in autumn)	o.c.	0.24
Carrots	3	2	oil	9.5 (in spring)	o.c.	<0.05
Beetroot	2	2	oil	11	pre-em.	0.01
Beetroot	2	2.5	granular	5	o.c.	0.01
Parsley	1	3.2	oil	10	o.c.	0.04
Celery	1	3.2	oil	5	o.c.	0.15
Endives	3	2	oil	6	o.c. (peat)	0.14
Endives		2	oil	8	o.c. (humus rich sand)	0.005
Lettuce	1	2	oil	6	o.c.	0.03
Spinach	8	2	oil	6	pre-em.	0.05
Spinach		2.5	granular	6	pre-em.	<0.03

Residues in vegetables grown on peat were found to be higher than in those grown on sand and those from clay and sandy clay intermediate. Residues from oil emulsions were higher than from granules. - D.M.L.S. [L.AM.]

159. FANG, S.C. and THEISEN, P. (State Coll., Corvallis,Oregon,U.S.A.) An isotopic study of ethyl-N,N-di-n-propylthiolcarbamate (EPTC-S^{35}) residue in various crops. J.Agric.Fd Chem., 1959, 7,(11),770-1, figs.1,tabs.2,bibl. 3.

A radioactive isotope technique is described for determining sulphur-35-labelled EPTC residues in plants with a lower limit of detection of 0.2 µg. The EPTC is readily absorbed by crops from soil and is rapidly metabolized. From 80-90% of the absorbed radioactivity is soluble in water and the rest remains in the tissues. The highest free EPTC-S^{35} residue found in plant tissue does not exceed more than 3% of the total amount absorbed. - From Authors' Summary. - J.W.B. [O.W.]

160. SHEETS, T.J. (A.R.S.,U.S.Dep.Agric., Univ.Davis,Calif.,U.S.A.) Effects of soil type and time on the herbicidal activity of CDAA, CDEC and EPTC. Weeds, 1959, 7,(4),442-8, tabs.5,bibl.4.

In greenhouse experiments on oat plants in undrained soils, the phytotoxicity of

soil incorporated EPTC >>CDAA >CDEC. LD 50 values for CDAA and CDEC showed a 2.9 and 2.7 fold difference respectively over a range of soil types but no simple relationship was observed. In all soils, high initial concentrations of CDAA and CDEC were reduced to negligible values after 3 months.

The toxicity of EPTC increased in proportion to % organic matter, % clay and the cation exchange capacity of the soil. (These factors were closely related and soils high in one were high in all). Little inactivation of EPTC occurred during 3 months in most soils and in the case of Yolo silty clay this was retarded by autoclaving prior to EPTC treatment, which suggests that inactivation may be due to microbial breakdown. Soil types studied were Sacramento clay, Yolo silty clay, Yolo clay loam, McClellan clay, Yolo sandy clay loam, McClellan loam and Hispernia sandy loam. % Organic matter ranged from 5.96-0.28, % clay 79.5-16.0, cation exchange capacity 3.12-7.5 and pH 8.4-5.7. - M.E.L.

[O.W.]

161. FERNLEY, H.N. and EVANS, W.C. (Univ. Coll.,Bangor,Wales). Metabolism of 2:4-dichlorophenoxyacetic acid by soil Pseudomonas: Isolation of α-chloromuconic acid as an intermediate. Biochem.J., 1959, 73, (1),22P, bibl.3.

A strain of Pseudomonas sp. originally isolated from conifer litter was grown in a mineral salts medium containing up to 0.1% 2,4-D as the sole carbon source. Evidence is adduced that suggests that cis-cis α-muconic acid is formed at the end of the lag phase as an intermediate product in the breakdown of 2,4-D. - L.K.

[O.BO.]

162. JENSEN, H.L. Biologisk sønderdeling af ukrudtsmidler in jordbunden. I. [The biological decomposition of weedkillers in the soil. I.] Tidsskr.Planteavl., 1959, 63,(3),470-99, (Dan.e.), figs.13,tabs.14, bibl.20.

The bacterial decomposition of the sodium salts of TCA, dalapon and monochloroacetic acid was determined as the CO_2 produced and/or the ionisation of organically bound chlorine. Monochloroacetate was the most easily decomposed, fungi and bacteria being responsible. Soil pH of 4.5-7 had little effect. The compound was only resistant to breakdown in acid soil at low temperature (7°C) or under anaerobic conditions. TCA was only decomposed by a special group of bacteria (Arthrobacter?) after a considerable lag period. The bacteria showed little activity at < pH 5.4 or < 7°C. Breakdown occurs under anaerobic conditions. Dalapon behaved very similarly to TCA but the active organisms were Agrobacterium sp. and certain pseudomonads and it was slightly less stable than TCA. The decomposition of dalapon and TCA was accompanied by an increase in the numbers of the bacteria which decomposed them. Innoculating with the appropriate bacteria greatly reduced or eliminated the lag phase with all compounds. - From Author's Summary. - L.K.

[O.RE.]

163. MAGEE, L.A. and COLMER, A.R. (State Univ.,Baton Rouge,La,U.S.A.) Decomposition of 2,2-dichloropropionic acid by soil bacteria. Canad.J.Microbiol., 1959, 5,255-60.

Eight bacteria capable of decomposing dalapon were isolated from soil by means of enrichment techniques and selective media. Six of these were tentatively classified as Agrobacterium and 2 as Pseudomonas. These organisms and many unidentified actinomycetes, molds and bacteria, including a Micrococcus sp., overcame the inhibitory effect of dalapon on an agar-decomposing bacterium when grown on the same plate. - Soils & Fert., 22,(5), 2422.

164. BROWNBRIDGE, N. Studies on the breakdown of 2,4-dichlorophenoxyacetic acid and some related compounds by soil micro-organisms. Ph.D.Thesis Lond.Univ.(Bedford Coll.), 1956, pp.202, (+ appendix), figs.72,tabs.72,bibl.142.

This thesis is concerned with an attempt to elucidate the breakdown of growth regulators and related compounds by soil bacteria. The compounds tested were: phenoxyacetic acid, 2-CPA, 3-CPA, 4-CPA, 2,4-D, 2,5-DA, 3,4-DA, 2,4,5-T, MCPA, 2,4-dimethylphenoxyacetic acid, 4-iodophenoxyacetic acid, 4-CPP, 2,4-DP, 2-chlorophenol, 4-chlorophenol and 2,4-dichlorophenol. They were tested either singly or in series. The soil perfusion technique and assay technique (Cress Test) are described in detail and the synthesis of 3,4-DA and 4-iodophenoxyacetic acids given. Attempts to produce pure cultures of bacteria that were capable of decomposing the compounds were unsuccessful. It was not found possible to adapt Pseudomonas fluorescens to break down 2,4-D. When compounds were applied in series the lag phase was either shortened or lengthened (i.e. cross adaptation and its opposite). Of the herbicides tested it was found that after breakdown of 4-CPA cross-adaptation was evident with 2,4-D and to a lesser extent with MCPA and 2,4-DP; after 2,4-D, with 4-CPA and MCPA but not with 2,4,5-T and 2,4-DP; and after MCPA, with 4-CPA, 2,4-D and 3,4-DA but not with

2,4,5-T. Soils adapted to 2,4-D breakdown were found to retain this property during 1 year's storage under partially anaerobic conditions or during prolonged perfusion with water. There appears to be a close correlation between toxicity in the cress test and breakdown in the soil; this is discussed with reference to the influence of molecular structure on activity and a possible relationship between breakdown products and biotin metabolism indicated. In the root test 2-CPA reacted synergistically with both 2,4-D and 4-CPA. - Partly From Author's Abstract. - L.K. [L.U.]

165. ELFADL,M.M.ABOU. Effect of sodium and MCPA on root nodulation of legumes and soil microorganisms. Agric.Res.Rev., 1958, 36,(2),333-7.
Neither MCPA nor 2,4-D had any inhibiting effect on root nodulation of legumes at rates up to ca. 3 #. No harmful effect on soil micro-organisms was observed from MCPA 1 # or from 2,4-D 1 and 2 #, but from 3 # toxic effects were seen. MCPA was more toxic than 2,4-D but its action was less lasting. - From Bull.agric.Congo belge, 50, (5),1445. - D.M.L.S.

APPLICATION AND MACHINERY

See also 46,61,102,199.

166. NETHERLANDS. Aircraft and equipment. Agricultural Aviation, 1959, 1,(2),42-6, figs.5.
Includes a description of a new nozzle designed by Sud Aviation for the Alouette II helicopter, with which it is hoped to be able to change nozzle output and droplet size independently of each other. - J.W.B. [O.RE.]

167. MAPOTHER, H.R. and TAPSCOTT, A.R. (Agric.Res.Sta.,Long Ashton,Bristol,England). Spray application problems: L. Tracers in spray liquids: Experiments with abaca (Musa textilis, Nee). Rep.agric.hort.Res.Sta. Bristol, 1958, 142-6, figs.12,bibl.6.
Saturn Yellow 0.1% as a suspension, incorporated with insecticidal sprays used on apples and pears and on abaca, afforded a rapid and simple method of assessing the type and degree of spray deposit on foliage. In its present form the method cannot be used quantitatively. - Partly From Authors' Summary. - D.M.L.S. [O.RE.]

168. LITTLE, E.C.S. (Dep.Agric.,Oxford Univ.,England). Drift. Agric.Aviation, 1959, 1,(4),98-103, figs.2,bibl.7.
A review with emphasis on the need for more research into drift problems, including crop tolerances. - D.M.L.S. [387(42)]

169. COURSHEE, R.J. (N.I.A.E.,Wrest Park,Silsoe,Beds.,England). Investigations on spray drift. Part II: The occurrence of drift. J.agric.Engng Res., 1959, 4,(3), 229-42, figs.10,tabs.10,bibl.10.
The equations of motion of small drops projected downwards across a horizontal wind are examined to suggest the circumstances under which they will become spray drift. Measurements were made of the fraction of the spray which is formed into small drops, and the size of the spray drops which become drift at different wind speeds and nozzle heights. Both in theory, and by these measurements, it is seen that, at a given wind speed, drift can best be reduced by keeping the nozzles low,using flat rather than cone nozzles, and by avoiding small drops in the spray. The latter has been achieved most readily with low pressure on ground sprayers and by a combination of low pressure and modifications of the spray liquid when using aerial sprayers. - From Author's Summary. - J.W.B. [396(42)]

170. HIGGINS, R.E. and DAVIS, E.H. Farm power sprayers. Bull.Pacif.Northw. Co-op.Ext.,Sept., 1958, 23, figs.
The choice of a suitable machine, safety precautions to be observed, control of application,pressure regulation and the calibration and checking of a sprayer to determine whether it is delivering at the required rate, are discussed. - Agric. Hort.Engng Abstr., 10,(4),1564.

171. GREAT BRITAIN. To beat bracken. Fmr & Stk-Breed., 1959, 73,(3650),77, figs.1.
Brief description and illustration of sprayer mounted above the Holt Weed Breaker. Revolving blades chop the weeds down and the spray which is fed onto the blades smear the cut ends of the weeds with herbicides. With certain weeds, this method allows the use of lower concentrations of herbicides and preliminary trials suggest this may also be true for bracken (Pteridium aquilinum). - L.K. [O.W.]

See also 117,148,149,164.

172. LEONARD, O.A. (Univ.Exp.Sta., Davis,Calif.,U.S.A.) Studies on the absorption and translocation of 2,4-D in bean plants. Hilgardia, 1958, 28,(5), 115-60, figs.18,tabs.6,bibl.31.

Extensive experiments are reported using drop and spray applications of 2,4-D to Phaseolus vulgaris seedlings. Variables included concentration, dosage and point of application; the use of various oils, hydrocarbons and silicones as diluents for esters; the addition to aqueous solutions of various surfactants, humectants and other additives including ethanol, sucrose and boric acid; and the comparison of various amine and ester formulations. A general discussion of absorption and translocation of 2,4-D is given. Observations were also made on growth depression and stem bending and on the distribution of radioactively labelled 2,4-D, MH and amitrol. - C.C.McC. [165(79.4)]

173. ASHTON, F.M. (Dep.Agric.Bot.,Univ., Davis,Calif.,U.S.A.) Effect of gibberellic acid on absorption, translocation and degradation of 2,4-D in red kidney bean. Weeds, 1959, 7,(4),436-41, figs.2,tabs.1, bibl.8.

Kidney beans (Phaseolus vulgaris) with the first trifoliate leaf unfolding were sprayed with 100 p.p.m. aqueous solution of gibberellic acid (potassium salt) 48 hours prior to the application to one primary leaf, of 10 micrograms of 2,4-D labelled with C^{14} in the carboxyl group. The 2,4-D in the untreated areas of the plants was estimated quantitatively (1) at intervals during the first 24 hours, (2) at intervals over 10 days, the treated leaves being removed after the first 24 hours and (3) 1, 3, 5 and 10 days after application. The experiments were repeated but with the omission of the gibberellic acid treatment. The results showed: (1) the rate of absorption and translocation of 2,4-D during the first 24 hours was unaffected by gibberellic acid, (2) the rate of degradation of 2,4-D over 10 days was unaffected by gibberellic acid and (3) the decrease in 2,4-D content after 3 and 5 days was much less in the plants treated with gibberellic acid than in the untreated, but it was level after 10 days. It was, therefore, concluded that the higher content of 2,4-D resulted from increased translocation. - M.E.L. [O.W.]

174. CURRIER, H.B. (Univ.,Calif.,U.S.A.) Pathways of foliar penetration. Proc.Calif. Weed Conf., 1959, 11,53-5.

A brief discussion with particular reference to wetting agents. In general, the more water-soluble the herbicide, the greater the effectiveness of the surfactant. The author believes the pathway of aqueous herbicidal sprays to be both cuticular and stomatal. For stomatal penetration it is necessary to have open stomata and an efficient surfactant in the solution, this is thought to be the main effect of surfactants. Three methods were used to study foliar penetration- fluorescent dye tracers, radioactive herbicide tracers and histochemical precipitation of Prussian blue. It was thought from these tests that once inside the intercellular spaces of the leaf, some movement at least, takes place in the cell walls.

Slides are described which illustrated the discussion. - J.W.B. [O.W.]

175. RAKITIN, Yu.V. and POTAPOVA, A.D. [The penetration of herbicides into plants and their influence on phosphorous uptake.] Fiziol Rast., 1959, 6,(5),614-6, (Russ.), tabs.3,bibl.8.

Seeds of peas, maize and wheat were soaked in 0.05% radioactive 4-iodophenoxyacetic acid for 15.5 or 24 hours. Counts made 4-6 hours after immersion showed that after treating for 15.5 hours % distribution in (1) seed coat, (2) endosperm and cotyledons and (3) embryo was for peas: (1) 10, (2) 27 and (3) 63 and for maize:- (1) 35, (2) 25 and (3) 38. Counts made 5-6 hours and 13 days after soaking seeds for 24 hours showed the % distribution to be for peas:- (1) 11 and 48, (2) 39 and 25 and (3) 50 and 27; for maize:- (1) 39 and 24, (2) 20 and 28 and (3) 40 and 48 and for wheat:- (1) 30 and 34, (2) 10 and 18 and (3) 60 and 47. The upper leaves of 30 day old sunflower and 14 and 30 day old oats were treated with the same solution. Counts made after 2 days showed that the proportional distribution in middle part of the stem and the leaves; lower part of the stem and roots was - for sunflower 7:5:6; for 14 day old oats 7:8:6 and for 30 day old oats 6:8:5. The effect on the uptake of radioactive phosphorous by oat and Phaseolus of treating the upper leaves only with (1) 0.1% 2,4-D, (2) 1% OP-7 [a surface active agent] and (3) 0.25% CIPC + 1% OP-7 was determined. Two days after treatment the % of P^{32} in the upper leaves (compared with

the controls) was for oats and Phaseolus:- (1) 56 and 22, (2) 143 and 36, and (3) 133 and 46. Five days after treatment the distribution in the same (upper) leaves was:- (1) 64 and 148, (2) 14 and 46 and (3) 47 and 159 and in the lower leaves:- (1) 252 and 138, (2) 60 and 86 and (3) 215 and 186. - L.K. [O.W.]

176. van der GRAAF, A.J. (Rijkstuinbouwconsulentschap, Valkenburgerlaan 3, Boskoop, Netherlands). Werkt simazin ook via de bladeren. [Does simazine also act via the leaves.] Boomkwekerij, 1959, 14, (21), 184.

From an experiment it appears that simazine may also be taken up by the aerial parts of plants; in certain plants this is clearly seen as a discolouration along the edges of the leaves. - Landbouwdocumentatie, 1959, 5073.

177. APPALANAIDU, B. (State Univ., Kansas, U.S.A.) Studies on the effects of 2,4-dichlorophenoxyacetic acid on Brassica kaber D.C., Hibiscus esculentus, L., and Helianthus annuus L. Diss.Abstr., 1959, 20, (3), 858, Microfilm $2.85, pp.219.

9-10 in. high plants of the 3 species were sprayed or injected with 2,4-D at 5000, 2500, 500, 250 and 100 p.p.m., to investigate the formative influence on vegetative and floral parts. Hibiscus esculentus (1) and Helianthus annuus (2) exhibited early responses to all concentrations. In Brassica kaber [Sinapis arvensis] (3) responses were less pronounced at the 3 lower concentrations. Axillary buds of all 3 species were inhibited when the decapitated stems were injected with 2,4-D (indicating apical dominance exhibited by the chemical). At 100 p.p.m. (3) was killed but (1) and (2) continued to grow although they produced malformed leaves and flowers. In the flowers of (1) the epicalyx became tubular, the corolla was fused, the androecium reduced, and the number of stigmas increased in some flowers and decreased in others. Similarly in (2), the bracts underwent changes in size and shape, the number of stamens increased in disk florets, and the number of stigmas increased in certain flowers; there was also a change in colour of bracts, corolla and stigmas. Histological changes in the stems of (1) and (2) followed the same pattern. Roots developed from proliferation of the cambium, and from ray and phloem parenchyma. Root development was observed in the pith region of (1) but not of (2). Replacement tissue was well developed in the leaves of (1) but only partially developed in those of (2). In (2), roots, unorganised root-like structures, and masses of meristematic cells were differentiated in the inflorescence. (3) behaved peculiarly in organising finger shaped processes from the cambium and parenchyma cells of ray, phloem and cortex, the reason for this is unknown. - J.W.B. [O.R.]

178. ÅBERG, B. (Inst.Plant Physiol., Uppsala, Sweden). Studies on plant growth regulators XV. The naphthylacetic and the α-naphthyl-propionic acids. Kgl. LantbrHögsk.Ann., 1959, 25, 221-39, figs. 10, tabs.2, bibl.58.

Both enantiomorphs of 1-naphthylpropionic acid (1) showed auxin activity; the D (+) form was most active in the Avena cylinder and wheat root tests while the reverse was true of the flax root test. The introduction of a 4-methyl group into 1-naphthylacetic acid (NA) or (1) decreased the auxin activity. 2-NA is thought to be an intermediate auxinic growth regulator, showing both auxin and anti-auxin effects. In the corresponding propionic acids the auxin component was further weakened and the difference in activity between enantiomorphs almost lost in the Avena cylinder and wheat root tests; however, the L (-) form is slightly more active in the flax root test. - L.K. [O.W.]

179. RAKITIN, Yu.V., MELNIKOV, N.N., SHIDLOVSKAYA, I.L. and BOKAREV, K.S. (Timiryazev Acad.Sci., Moscow). [The structure and physiological activity of some 2,4,5-trichlorophenoxyacetylamino acids.] Fiziol.Rast., 1959, 6, (6), 729-34, (Russ.), tabs.4, bibl.16.

Sixteen 2,4,5-trichlorophenoxyacetylamino acids were prepared by reacting the chloranhydride of 2,4,5-T with the appropriate amino acid (see Weed Abstr., 6, 239) - melting points, $[\alpha]_D^{20}$ in dioxane and yields are given. The physiological activity of the compounds was compared with 2,4,5-T by soaking seeds of radish and wheat in concentrations of 10^{-1} to 10^{-4} for 24 hours and measuring root and shoot growth. All compounds inhibited root and shoot growth of radish more than 2,4,5-T at more than one concentration, while on wheat there was much greater variation with concentration. Shoot growth of wheat at 10^{-1} was inhibited more than 2,4,5-T by the dl-serine, dl-cystine, l-cystine, dl-asparagine and

d-glutamic acid derivatives. The other derivatives tested were: glycocol, dl-α-aminopropionic acid, β-aminopropionic acid, dl-valine, l-leucine, dl-phenylalanine, l-lysine, dl-methionine, l-glutamic acid, dl-glutamic acid and dl-tryptophane. - L.K. [O.W.]

180. FREED, V.H. (State Coll., Oregon, U.S.A.) What we know about the use of wetting agents with herbicides. Proc. Calif. Weed Conf., 1959, 11, 43-9.
A discussion of the influence of surface active agents on the absorption of herbicides. Tables show, inter al., that different wetters, which cause the same reduction in surface tension of amitrol, promote its absorption in widely varying degrees. - L.K. [O.W.]

181. FUJITA, T., IMAI, S., KOSHIMIZU, K., MITSUI, T. and KATO, J. (Kyoto Univ., Japan). Plant growth activities of 5- and 8-halogenodihydro- and -tetrahydro-1-naphthoic acid. Nature, Lond., 1959, 184, (4696), 1415-6, tabs.1, bibl.7.
1,4-dihydro-, 3,4-dihydro- and 1,2,3,4-tetrahydro-naphthoic acids and the 5- and 8-chloro- and bromo- derivatives were synthesised and tested in the pea straight growth tests at 0.1 - 300 p.p.m.. All compounds increased growth at 10 p.p.m. and above, and all except 3,4-dihydro- and its 5- derivatives at 1 p.p.m. The authors consider that the differences in activity are probably due to differences in the spatial position of the carboxyl group with reference to the ring system and this is briefly discussed. - L.K. [O.W.]

182. FOUNTAIN, C.A. (State Univ., Mich., U.S.A.) Effects of various plant regulators on the growth and development of selected herbaceous ornamentals. Diss. Abstr., 1959, 20, (4), 1118, Microfilm $2.00, pp.133.
This paper describes an investigation into the effects of growth regulators (including MH and sodium trichlorobenzoate) on vernalization (1), on various photoperiods (2); the interaction of growth regulators with (1) and (2) and the effect of growth regulators on the morphology, flowering and development of several herbaceous ornamentals. - J.W.B. [O.R.]

183. HILTON, J.L., ARD, J.S., JANSEN, L.L. and GENTNER, W.A. (A.R.S., U.S. Dep. Agric., Beltsville, Maryland, U.S.A.) The pantothenate-synthesizing enzyme, a metabolic site in the herbicidal action of chlorinated aliphatic acids. Weeds, 1959, 7, (4), 381-96, figs.4, tabs.4, bibl.2.
Inhibition in vitro of the pantothenate synthesizing enzyme from acetone powders of Escherichia coli ATCC 9637 by chlorinated aliphatic acids occurred through competition of the herbicide with pantoate for a site on the enzyme. The order of toxicities was 2,3,3'-trichloroisobutyric acid > TCA = 2,2,3-trichloropropionic acid > 2,3-dichloroisobutyric acid > dalapon. DL-2-chloro-4-hydroxy-3,3-dimethylbutyric acid inhibited pantothenate synthesis.
Barley seeds were germinated under greenhouse conditions in perlite saturated with Hoagland's solution to which dalapon 4 # was added 10 days after planting. A cut leaf of the 8-day old seedling was immersed in 0.02 M solutions of the metabolites for 9 days.
Abnormal tiller development was reduced by calcium pantothenate but not by $CaCl_2$ (0.01M) or by β-alanine. Effects of potassium pantoate were variable and damage to the treated leaf occurred.
Oats were treated with pantothenate (2.5mg per seed) at planting and dalapon 24 hours after planting. Fresh weight of tops was determined 3 weeks later. Pantothenate offset the inhibitory effects of dalapon at 4 # but not 8 #. Neither oats nor barley were affected by the metabolites alone.
In ryegrass seedlings, growth inhibition of dalapon (0.001 M) on coleoptiles was reduced from 60% (of the growth level obtained with β-alanine alone) to 44% to 30%, and on roots from 49% to 28% to 12% by β-alanine at concentrations of 0, 0.001 and 0.01 M respectively.
% Root growth inhibition over 96 hours of ryegrass seedlings after treatment with chemicals at 0.002, 0.005 and 0.05 M were:- ethyl dl-4-chloro-2-hydroxy-3,3-dimethylbutyrate*, 50%, 97% and 100%; γ-lactone of 2-chloro-4-hydroxy-3,3-dimethylbutyric acid*, 50%, 77% and 100%; dalapon, 50%, 76% and 99%; and % inhibition at 0.005 and 0.05 M: dl-N-(2-chloro-4-hydroxy-3,3-dimethylbutyryl)-β-alanine*, 12%, 83%; dl-pantoyl taurine, 13%, 53%; dl-2-chloro-4-hydroxy-3,3-dimethylbutyric acid*, 13% and 53%. (* Syntheses given). - M.E.L. [O.W.]

184. FAWCETT, C.H. (Wye Coll., Univ. London, England). Plant-growth substances and the copper chelation theory of their mode of action. Nature, Lond., 1959, 184, (4689), 797-8, figs.3, bibl.7.
Evidence is adduced that does not support the

concept that plant-growth regulating activity is explicable in terms of chelation. - L.K. [O.W.]

185. DAS, N. (Gauhati Univ.,Assam, India). Studies on the effect of time factor on the stimulation of root growth by certain antiauxins. Indian J.Plant Physiol., 1958, 1,44-53, figs.3,tabs.1, bibl.19.
Solutions of naphthylmethylsulphideacetic acid, α-1-naphthylmethylsulphidepropionic acid, 4-chloro-3-nitrobenzoic acid, 4-fluoro-3-nitrobenzoic acids and 4-chlorophenoxy-iso-butyric acid stimulated the growth of sections of roots of peas soaked therein. The increase in growth rate, compared with the control, was marked for the first 3-6 hours, then remained nearly constant till 24 hours after the beginning of the experiment, after which it fell so that by 48 hours after treatment commenced growth was nearly the same in the treated and control sections. - L.K. [O.RE.]

186. * MICHALSKI, L. Section cutter and test-tube clinostat for studies on plant growth regulators by the cylinder test method. Wiad.bot., 1958, 2,(4),(Polish).

187. MORELAND, D.E., GENTNER, W.A., HILTON, J.L. and HILL, K.L. (Agric.Exp. Sta.,Raleigh,N.C.,U.S.A.) Studies on the mechanism of herbicidal action of 2-chloro-4,6-bis(ethylamino)-s-triazine. Plant Physiol., 1959, 34,(4),432-5, figs.2,tabs.2,bibl.6.
Low concentrations of simazine were found to inhibit the photochemical activity of isolated chloroplasts from barley, as shown by the effect on ferricyanide reduction. Chloroplasts from maize responded similarly. Partial protection from the effects of simazine added to the culture medium of young barley plants, was given by supplying glucose through severed leaf tips. This is taken to support the hypothesis that the lethal effect of simazine is due to interference with the photosynthetic mechanism. - K.H. [O.W.]

188. MUNAKATA, K., YOKOYAMA, K., SHIRATA, T., HARADA, A. and HARA, F. (Dep.Agric.Chem.,Nagoya Univ.,Anjo-City Japan). Herbicidal activities of halogenoalkylcarboxylic acid esters. I. Germination inhibition activities. Weeds, 1959, 7,(4),470-3, tabs.1,bibl.4.
Treatment of rape, millet and rice seeds with esters of halogenocarboxylic acids showed the seed-killing activities of the monoiodo > monobromo > monochloroacetates > dichloropropionates > trichloroacetates > dichloroisobutyrates. The most effective alcohol moieties were the allyl, butoxyethyl, benzyl, and substituted phenyl. All the acid esters were more effective than the sodium salts.
46 Esters in all were tested at 25°C and at concentrations of 0.1 and 0.05% (w/v). Rates of germination were checked after 24, 48 and 72 hours. - M.E.L. [O.W.]

189. PASTAC, L.A. L'amino-triazol et la leucophyllie des plantes vertes. [Amitrol and the albinism of green plants.] Bull. Soc.bot.Fr., 1959, 106,(5/6),205-8, (F.)
Includes the information that Urtica dioica may be eradicated by amitrol and that a 6 year old tree of Acer platanoides was apparently killed by amitrol dumped at its base. The author suggests that the reason for the greater susceptibility of young leaves may be their relative lack of chlorophyllase. - L.K. [O.BO.]

190. PIZEY, J.S. and WAIN, R.L. (Chem. (Dep.,Coll.Techn.,Birmingham,England). Pre-emergent herbicidal activity of some substituted amides and related compounds. J.Sci.Fd Agric., 1959, 10,(11),577-84, tabs.4,bibl.14.
In laboratory and greenhouse experiments no general relationship was observed between the chemical structure of aromatic and of alkyl- or aryl-substituted aliphatic amides and their pre-em. herbicidal activity to cabbage, wheat and ryegrass. The activities of benzamides and phenylacetamides varied with the nature and size of the ortho-substituent and the selectivities depended on nature and number of N-substituents. Lack of correlation between ease of hydrolysis of amides to the parent acids and the activities of the amides and the acids indicated that formation of the acids is not the only mechanism whereby the amides exert their biological effects. No inhibition of caesin hydrolysis by papain was caused by N-methyl-o-chlorobenzamide. The activities and synthesis of 70 amides and of some related acids, amines and hydrazides are described. In greenhouse tests, o-chlorobenzamide, o-toluamide, o-chlorophenylacetamide and N,N-dimethyl-o-chlorophenylacetamide at 6 # showed pre-em. activity

against blackgrass [Alopecurus myosuroides], chickweed [Stellaria media] and poppy [Papaver sp.] but not wild oat [Avena sp.]. Italian ryegrass, carrot and lucerne were affected but not linseed, cabbage, turnip, sugar beet, lettuce, onion, pea, bean, maize, wheat and oat crops. - M.E.L. [O.W.]

191. BROWN, H.D. (Loyola Univ., New Orleans, La, U.S.A.) Effects of respiratory inhibitors upon nectar secretion in Antirrhinum. Bull.Torrey bot.Cl., 1959, 86,(5), 290-5, figs.1, tabs.2, bibl.10.

Antirrhinum buds were floated on a sugar medium containing various respiratory inhibitors including sodium arsenite. The latter caused stunted and malformed flowers but did not inhibit nectar secretion. - L.K. [O.BO.]

192. BASS, S.T., HAMNER, C.L. and SELL, H.M. (State Univ., East Lansing, Mich., U.S.A.) Effects of 2,4-dichlorophenoxyacetic acid on the mineral contents of cranberry bean plants (Phaseolus vulgaris). Quart.Bull.Mich.agric.Exp.Sta., 1959, 42,(1),43-6, tabs.1, bibl.17.

As an introduction, the authors mention briefly some of the results that have been obtained by other investigators.

In this experiment, 2,4-D (0.05 ml of a 1200 p.p.m. solution) was applied to the base of the primary leaf blade of bean plants when the first trifoliate leaves were expanding. Plants were harvested 6 days after treatment, dried in an air oven, and analysed for mineral content of stems, roots and leaves. Stem tissue of treated plants showed a considerable increase in boron and phosphorous; a slight increase in copper and manganese; a decrease in calcium, potassium and iron; and very little change in sodium and magnesium content. Roots of treated plants showed an increase in boron, copper, potassium and phosphorous; a decrease in calcium, magnesium and sodium; and little change in iron and manganese content. Leaves of treated plants showed an increase in potassium and sodium; a decrease in calcium; and little change in boron, copper, iron, magnesium, manganese and phosphorous content. - J.W.B. [O.RE.]

193. VLASYUK, P.A. and PORUTSKII, G.V. [On the joint action of herbicides and radioactive substances.] Nauch.Trud.Ukr. Inst.Fiziol.Rast., 1958, 15,61-70,(Russ.)

2,4-D and MCPA at 10, 50 and 100 p.p.m. + P^{32}, Ca^{45}, S^{35} and Na^{24} at 0.03, 0.3 and 3 $\mu c/m^2$ were tested. It was found that the addition of the radioactive substances greatly increased the herbicidal effect of 2,4-D and MCPA. The viability of Polygonum and Urtica (in cereals) which are resistant to 2,4-D was decreased. - From Ref.Zh.Biol., 1959, 84209. - L.K.

194. YAMADA, T. Studies on the effect of some inorganic salts as herbicides with special reference to grassland improvement. III. Difference of injurious degree by sodium chlorate between gramineous and leguminous plants and discussion of its cause. Bull.Nat.Inst.agric.Sci.Japan, 1958, 15,98-108, (e.)

Seedlings of oats and wild vetch were cultivated in transpirometers containing 0.1-5% sodium chlorate. Oats wilted irreversibly after 70 hours in the lower concentration and after 30 in the higher; vetch wilted after 140 and 100 respectively. Oat roots were brown whereas those of vetch showed no injury. Vetch took up 79 mg/g fresh weight from the 5% solution and 17 mg from a 0.5% solution (based on water uptake). Oats took up less. The author considers that legumes are able to decrease the amount of salt taken up with increasing concentration, whereas grasses are not. The following relationship is suggested:- $\log Y + aX = b$ (Y = time of wilting from the beginning of treatment, X = salt concentration, a = the strength with which salt uptake is inhibited at high concentrations, b = beneficial (zuträglich) limiting concentration; b may be explained by the differing ability of plants to reduce ClO_2^-. From the values obtained with this formula it is possible to compare various herbicides and degrees of toleration of various plants. - Z. PflErnähr.Düng., 85,258.

195. SAKIROV, M.S. [Changes in carbohydrate and nitrogen metabolism in cotton defoliation.] Uzbek.biol.J., 1958, (1), 20-4.

Cotton was treated with (1) 2% calcium cyanamide, (2) 0.5% sodium cyanamide and (3) 5.02% endothal; leaves were collected (a) 13-14 hours, (b) 3 days after treatment and (c) after leaf fall. All compounds caused a decrease in organic-N, particularly (3). The content of amino acid-N was increased by 1 and 2 in b and c and by 3 in c. This is connected with proteinase activation. Detailed observations are made on

changes in the content of N-compounds and sugars in the leaves, stems and branches after treatment of whole plants with 1. The decrease in protein-N in the leaves and the simultaneous increase in amino acid-N and the increase in total and amino acid-N in the branches indicates that complex N-compounds in the leaves are hydrolysed as a result of treatment with 1 into simpler compounds and are transported to the stems. The decrease in soluble carbohydrates in the leaves and branches is held to be due to interference with photosynthesis by 1 or, less probably, to movement into other organs. The increase in sugars of the maltose type and other saccharides in the leaves with an equal decrease in insoluble carbohydrates is connected with the hydrolysis of the latter. - Chem.Zbl., 130,13847.

Noted

195a. CRAFT, C.C. and AUDIA, W.V. (Biol. Sci.Branch,Agric.Marketing Ser.,U.S.D.A., Beltsville,Maryland,U.S.A.) Some effects of isopropyl N-(3-chlorophenyl) carbamate on respiration, water uptake and ion leakage of potato tissue. Amer.Potato J., 1959, 36,(11),386-93, tabs.4,bibl.21.
A fuller version of the paper abstracted in Weed Abstr., 8,306. [O.W.]

PATENTS

196. AUSTRIA. Austrian Patent, 1955, 183 595.
Herbicide of the general formula AR-X-CH_2 COOH where X = O and AR = a substituted aromatic. To I.C.I. - From Chem.Zbl., 130, 714. - L.K.

197. GREAT BRITAIN. Composition for the control of wild oats. British Patent, 1957, 794 479.
To Dow Chem.Co. 1,2,4,5-tetrachlorobenzene intimately admixed with inert finely divided solids or surface-active dispersing agents. - J.Sci.Fd Agric., 10,(10), ii-167.

198. GERJOVICH, H.J. and JOHNSON, R.S. Unkrautbekämpungsmittel. [Weedkiller.] German Patent, 1959, 971 511.
Phenyl urea derivatives. Particularly N-(carbamyl) amides. To E.I. du Pont de Nemours. - From Chem.Zbl., 130,14541.

MISCELLANEOUS

199. GERMANY. Deutscher Pflanzenschutzkalender 1960. [German plant protection calendar 1960.] Deutscher Bauernverlag,n.d., pp.129, (G.), figs.
Consists of a number of short articles (ca. 1-2 pp.) several of which are on the use of herbicides. One contribution (p.105-6) illustrates and describes a method of estimating nozzle performance; the nozzle is attached to a very long pendulum to simulate movement in the field and passed over a baseboard covered with 10 x 10 cm containers. - L.K. [W13(43)]

200. ANDERSON, E.G. (Dep.Agric.,Ottawa, Ontario,Canada). Trends in weed control. Rep.Quebec Soc.Plant Prot., 1958, 46-58, bibl.23.
The author reviews, inter alia, the numbers and value of registered herbicides in Canada; the uses of herbicides; seed drill surveys; seed-cleaning; weed control by animals; the increase in research on, information concerning, and financial support for weed control; the biological control of Hypericum perforatum; weed seed screening; devitalization of weed seeds; and the wild oat [Avena fatua] problem. The number of registered herbicides has increased from 91 in 1946 to 362 in 1956. The 1956 value was $6450 million, an increase of over $5,000 million. Geese are being increasingly used to control weeds in strawberries and raspberries and have also been successfully used in cotton, beet, beans, asparagus, potatoes, onions, vineyards and nurseries. Young geese are more economical and more selective, 3-4/ac being recommended when weeds are just emerging. Reindeer have been used successfully in Norway to control weeds in potatoes. Recent work in Alberta has confirmed the value of sheep to control leafy spurge [Euphorbia esula] whereas crested wheatgrass in competition did not control it. - D.M.L.S. [O.W.]

201. CANADA. Manuel d'emploi des herbicides, 1959-60. [Herbicide manual, 1959-60.] Min.Agric.,Quebec,1959,pp.64,(F.)

A new edition with revised recommendations. Pp.9-25 deal with herbicides (mode of action, susceptibility lists of ca. 120 weeds to 2,4-D and MCPA and of 45 woody plants to 2,4-D and 2,4,5-T, time of application, properties of individual herbicides, and precautions in using them). Pp. 25-38 give information on techniques of spraying, and pp. 38-64 give recommendations for various crops and special weed problems. - D.M.L.S. [W4(71)]

202. CRESCINI, F. Agronomia generale. [General agronomy.] Traltati di Agricoltura, 1959, pp.636, Lire it. 4800, (It.), figs. 201, tabs.148.

Includes a chapter on crop rotation and agricultural weeds. - From Plant Breed. Abstr., 29,(4),4720. - D.M.L.S.

203. DETROUX, L. (Sta.Phytopharmacie, Gembloux,Belgium). Les herbicides et leur emploi. [Herbicides and their use.] J.Duenlot S.A.Gembloux, 1959, pp.220, figs. 27, tabs.3,bibl.127.

This handbook contains, in addition to information on the most commonly used weed-killers, tables giving the acid equivalent, molecular weight, and weight equivalent to 100 g of acid, of 26 formulations of 2,4-D, 2,4,5-T and MCPA and of 5 formulations of MCPB, 2,4-DB, mecoprop and 2,4,5-TP; a list of the susceptibility of 118 weeds to 13 weedkillers; and recommendations for the use of weedkillers in the principal crops (including ornamentals and forest nurseries), for woody and aquatic weed control, and for potato haulm destruction.

F r bulbs planted in the autumn (crocus, hyacinth, narcissus and tulip) monuron or neburon 1 or 2-4 kg/ha are recommended, applied in early spring before emergence or when the shoots are not higher than 5 cm. Gladioli are uninjured by monuron and neburon 1-2 kg/ha which may be applied pre-planting, pre-em. or post-em. (when 10-15 cm high). Simazine may also be applied pre-planting, pre-em. or post-em.; rates up to 2 kg/ha pre-em. are not injurious. As these compounds should control weeds for 2-4 months, they would seem preferable to MCPA 0.5 kg/ha pre-em. or to post-em. applications of potassium cyanate 5-10 kg/ha or of sodium isopropyl xanthate 15-20 kg/ha. + propham 5-7.5 kg/ha. In the case of ornamentals to be planted out, monuron 1 kg/ha or neburon 1-2 kg/ha applied pre-planting are recommended for begonias, and the same for dahlias but applied after planting when plants are 10-30 cm high, taking great care not to spray the plants. Monuron or neburon 1-2 kg/ha may also be used pre-planting for: Ageratum, aubretia, calceolaria, calendula, Canna, centaury, chrysanthemum, coleus, cosmos, fuchsia, geranium, wallflower, heliotrope, Iberis (candytuft), Antennaria, Lantana, Linaria, lobelia, Antirrhinum, petunia, pyrethrum, Callistephus chinensis, Salvia, tagetes, Verbena rugosa and Zinnia. The following woody ornamentals may be treated with monuron 1 kg/ha or neburon 1-2 kg/ha applied before bud opening and avoiding spraying the foliage: Acer, Aesculus, Berberis, Betula, Castanea, Catalpa, Laburnum, Fagus, Forsythia, Fraxinus, Ligustrum, Mahonia, Quercus, rose, Spiraea, Tamarisk [Liriodendron tulipifera] and Virburnum. Poplars, willows, Prunus spp. and other stoned fruit trees are sensitive. Simazine up to 5 kg/ha is not injurious to the following: Acer, [Hippophaë rhamnoides], oak, clematis, Rosa canina, Picea spp., "false buckthorn", raspberry, ash, currant, beech, ivy, buckthorn, Pinus silvestris or rose.

Other recommendations include:- for strawberries (excepting var. Mure Mo tot which is susceptible) - sodium isopropyl xanthate 15-20 kg/ha + propham 5-7.5 kg/ha in at least 1000 l water applied at the beginning of spring or propham alone after harvest; in onions and leeks when 6-7 cm high (but only against very young weeds) - potassium ethyl xanthate or sodium isopropyl xanthate 1.5-2 kg/ha; for killing tree stumps, sodium chlorate alone or mixed with an equal amount of sodium nitrate, applied to holes bored in the stump (1 hole/25 cm circumference) at 20-30 g/hole. (The stumps are then set alight some months later and will burn slowly above and underground); for potato haulm destruction - AMS 25-30 kg/ha. - D.M.L.S. [W4(493)]

204. GREAT BRITAIN. (Dow Agrochem.Ltd., 48 Charles Street,London,W.1,England). Dowpon. Its contribution towards cleaner farming. Publ.Dow Agrochem.Ltd., 1959, pp.44, figs.12, tabs.2.

An extension booklet describing the use of dalapon for the control of various grasses and its use in certain crops. The properties of the compound are dealt with briefly and an appendix table shows its compatibility with insecticides, nutrients and other herbicides. - L.K. [O.W.]

205. NEW ZEALAND. Meet the Phytazol family. Service, 1959, 4,(1),10-12, figs.5.

Three new products have been marketed by Ivon Watkins, New Zealand: (1) Phytazol "A" - a mixture of amitrol and dalapon, designed

primarily for the control of paspalum [P. dilatatum] and having a durability of 3 months minimum; (2) Phytazol "C" - a mixture of amitrol and monuron (durability 6 months minimum); and (3) Phytazol "S" - a mixture of amitrol and simazine (durability 12 months minimum). They are all designed primarily for weed control on uncultivated land, such as industrial sites, drains, roadsides, etc. - D.M.L.S. [O.W.]

206. HILLEBRANDT, P.M. The economics of the use of pesticides in agriculture with special reference to weedkillers on wheat in the south eastern half of England. Ph.D. Thesis, Lond.Univ., 1958, pp.280, figs.75, tabs.23, bibl.37.

An economic theory of the use of pesticides is formulated and a method described by which the optimum economic rate of application and the area of a crop which may be economically treated against a given pest may be estimated even, given basic assumptions, under conditions of uncertainty. In formulating the theory it was found that, though the form of the dosage response curve is governed by a multiplicity of factors, nevertheless its general shape can be determined. By field and postal surveys amongst practical agricultural advisers, data were obtained on the extent of the use of weedkillers on wheat in south east England, and the farmers' reasons for deciding whether or not to treat their crop and whether to buy a spraying machine were investigated. It was found that, although farmers usually aim at maximizing their profits, decisions on the application of weedkillers and on related economic problems are taken with little knowledge of economic principles and in many cases with little rational consideration. Research into the economic aspects of the use of pesticides and the further education of farmers are suggested as remedies. - From Author's Summary. - D.M.L.S. [L.U.]

207. McKENZIE, W.F. For and against the use of S.M.D. as a soil sterilizer. Comm. Grower, 1959, (3331), 743,745, figs.2.

SMDC was extensively used in glasshouses during the winter of 1958/59. Although there were instances of damage to lettuce and tomato crops, on the whole SMDC proved better than formaldehyde and next best to steam sterilisation. Control of weeds was good, and Oxalis (no sp. mentioned) appears to be fairly susceptible. In order to minimise risk of crop damage it is suggested that SMDC should be applied in autumn, while the soil is still warm, that less water should be used, that the soil should be forked up 10-14 days after application, and that a few test plants should be put in first, before planting up. - H.A.R. [NVRS]

208. DUFFIELD, J.W. (Industr.For.Ass., Nisqually, Washington, U.S.A.) What should we call the chemical tree killer? J.For., 1959, 57,(7),518.

The author protests against the use of the term "silvicide". He rejects "arboricide" for tree killer as being pedantic and "fruticide" for shrub killer as being open to misinterpretation, and urges the use of "herbicide" since the same compounds are used in forestry as are used in agriculture and horticulture. - D.M.L.S. [O.F.]

209. CHURCH, B.M. and WOODFORD, E.K. (Rothamsted Exp.Sta., Harpenden, Herts., England). A pilot survey of herbicide practice in north west Oxfordshire. Agric. Economics, 1960, bibl.2.

The results of a survey (by personal visit) of 83 farms are analysed, in particular the information obtained on the herbicides used, the proportions of crops treated, the methods of application (sprayer type and who does the spraying), the important weed species in the area, and the sources of the farmers' information on herbicides. - D.M.L.S. [395(42)]

Noted

209a. DONALDSON, T.W. A review. Chemicals used in weed control. Part II. J.Dep.Agric.Vict., 1959, 57,(9),585-93, figs.5.

C O N T E N T S

Volume 9, No. 1. January, 1960.

Arable and herbage crops 1

Horticultural, ornamental and plantation crops. 25

Biology of weeds and poisoning by weeds 67

Aquatic and woody weeds and their control 102

Other weeds and their control 122

Chemistry, physics, toxicology, residues and soils 148

Application and machinery. 166

Physiology, morphology and anatomy. 172

Patents. 196

Miscellaneous. 199

Prepared monthly by the Information Section, Agricultural Research Council Unit of Experimental Agronomy, Department of Agriculture, Parks Road, Oxford, England, and distributed by the British Weed Control Council, c/o Association of Corn and Agricultural Merchants, Cereal House, 58, Mark Lane, London,E.C.3. on subscription at £2 - 2 - 0 per year.

List of Common Names and Chemical Abbreviations

The following list, based on that adopted by the Weed Society of America has been approved by the British Weed Control Council, except those marked □.
An asterisk (*) signifies common names approved by the B.S.I.
A plus sign (+) signifies approval by the Weed Society of America.

amiben □+	3-amino-2,5-dichlorobenzoic acid
amitrol +□	3-amino-1,2,4-triazole.
AMS □+	ammonium sulphamate
atrazine □+	2-chloro-4-isopropylamino-6-ethylamino-1,3,5-triazine
barbane □+	4-chloro-2-butynyl-N-(3-chlorophenyl)carbamate
CDAA +	2-chloro-N,N-diallylacetamide
CDEA +	2-chloro-N,N-diethylacetamide
CDEC +	2-chloroallyldiethyldithiocarbamate
chlorpropham *	isopropyl-N-(3-chlorophenyl)carbamate
4-CPA +	4-chlorophenoxyacetic acid
4-CPB	4-(4-chlorophenoxy)butyric acid
2,4-D +*	2,4-dichlorophenoxyacetic acid
3,4-DA +	3,4-dichlorophenoxyacetic acid
dalapon +*	2,2-dichloropropionic acid
2,4-DB *	4-(2,4-dichlorophenoxy)butyric acid
DCU +□	dichloralurea
2,4-DEB +	2,4-dichlorophenoxyethyl benzoate
2,4-DES +*	sodium 2,4-dichlorophenoxyethyl sulphate
dichlone +*	2,3-dichloro-1,4-naphthaquinone
dinosam *	2-s-amyl-4,6-dinitrophenol
dinoseb *	2-s-butyl-4,6-dinitrophenol
diquat +	1,1'-ethylene-2,2'-dipyridylium dibromide
diuron +	N-(3,4-dichlorophenyl)-N',N'-dimethylurea
DMTT +□	3,5-dimethyltetrahydro-1,3,5,2H-thiadiazine-2-thione
DNOC *	2-methyl-4,6-dinitrophenol or 3,5-dinitro-o-cresol
2,4-DP	2-(2,4-dichlorophenoxy)propionic acid
endothal +	3,6-endoxohexahydrophthalic acid
EPTC +□	ethyl-N,N-dipropylthiolcarbamate
erbon +	2-(2,4,5-trichlorophenoxy)ethyl-2,2-dichloropropionate
fenac □ +	2,3,6-trichlorophenylacetic acid
fenuron +	N-(phenyl)-N',N'-dimethylurea
ipazine □+	2-chloro-4-diethylamino-6-isopropylamino-1,3,5-triazine
MCPA +*	4-chloro-2-methylphenoxyacetic acid
MCPB *	4-(4-chloro-2-methylphenoxy)butyric acid
MCPES +	sodium 4-chloro-2-methylphenoxyethyl sulphate
mecoprop *	dl-2-(4-chloro-2-methylphenoxy)propionic acid
MH +□	maleic hydrazide
monuron +*	N-(4-chlorophenyl)-N',N'-dimethylurea
neburon +	N-(3,4-dichlorophenyl)-N'-butyl-N'-methylurea
NPA +	N-1-naphthylphthalamic acid
PCP +	pentachlorophenol
PMA +	phenyl mercuric acetate
propazine □+	2-chloro-4,6-bis(isopropylamino)-1,3,5-triazine
propham *	isopropyl-N-phenylcarbamate
simazine+	2-chloro-4,6-bis(ethylamino)-1,3,5-triazine
SMDC +□	sodium methyl dithiocarbamate
2,4,5-T +*	2,4,5-trichlorophenoxyacetic acid
2,4,5-TB	4-(2,4,5-trichlorophenoxy)butyric acid
2,3,6-TBA +	2,3,6-trichlorobenzoic acid
TCA +	trichloroacetic acid
2,4,5-TES +	sodium 2,4,5-trichlorophenoxyethyl sulphate
2,4,5-TP	2-(2,4,5-trichlorophenoxy)propionic acid
trietazine □+	2-chloro-4-diethylamino-6-ethylamino-1,3,5-triazine
3Y9 □	tris-(2,4-dichlorophenoxyethyl)phosphite